





MoDOT

Joplin West Corridor
Purpose and Need Study

MoDOT JOB # J7P0847



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West Joplin Purpose and Need Study

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Acronyms and Abbreviations

AADT	average annual daily traffic
FHWA	Federal Highway Administration
FSS	future study sections
JATSO	Joplin Area Transportation Study Organization
KDOT	Kansas Department of Transportation
LRTP	long-range transportation plan
MoDOT	Missouri Department of Transportation
MOSM	Missouri Statewide Travel Demand Model
mph	miles per hour
MPO	Metropolitan Planning Organization
MSE	mean squared error
MVRCM	Model Validation and Reasonableness Checking Manual
NEPA	National Environmental Policy Act
O/D	origin/destination
OKDOT	Oklahoma Department of Transportation
PIP	public involvement plan
RMSE	root mean squared error
TAZ	traffic area zones
TIP	transportation improvement program
VMT	vehicle miles traveled
SAFETEA-LU	Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users

Planning for Progress in Joplin, Missouri, and the Four-States Area

Joplin, Missouri is located in southwest Missouri in the "four-states" region encompassing Oklahoma, Kansas, Missouri, and Arkansas.



At the edge of the Ozark Mountain region, Joplin has a current population of approximately 50,000. The daytime population is roughly 270,000, making it one of Missouri's largest metropolitan areas. Joplin is actively pursuing the continued vitality of the region.

As the largest metropolitan area in the four-state region, the Missouri Department of Transportation (MoDOT), the city of Joplin, and the Joplin Area Transportation Study Organization (JATSO) have cooperatively undertaken this purpose and need statement to investigate the transportation needs of western Joplin. The focus on western Joplin is based on the convergence of development trends and planning goals indicating that the region's transportation system may be inadequate to support community needs.

How We Are Studying Western Joplin

A purpose and need statement document is considered a "Pre-NEPA" document. It is unique because it doesn't investigate solutions, but rather focuses on problems and how to properly consider those problems. The rigorous definition of the problems that affect western Joplin will allow for informed future decision-making. The specific goals of the West Joplin Purpose and Need Statement are to:

- Identify the transportation problems that affect western Joplin.
- Establish the logical termini and independent utility for potential future projects.
- Identify the evaluation criteria that will be important for determining how well future alternatives address the identified transportation problems.
- Create a traffic model using the components of existing data to predict changes in traffic volumes and pathways.

Three Important Concepts used to Define Transportation Problems

The *Transportation Problems* are the overarching concepts that define the deficiencies that affect the study area.

The *Critical Elements* are the important trends that demonstrate the nature/ extent of the transportation problems.

The *Evaluation Criteria* are the metrics that project planners can use to develop alternatives to solve these problems and to evaluate their efficacy.

The Problems Facing Western Joplin

The West Joplin Purpose and Need Statement identifies three transportation problems affecting western Joplin:

1) Proposed Access Goals for Main Street Create Discontinuities - Planning in Joplin envisions a community where current access patterns more positively support community goals. To achieve these goals, vehicular traffic will be constrained. This will create discontinuities that represent transportation problems. The critical elements that define this problem are associated with:

- Speed reductions and truck restrictions on Main Street will force through traffic to take other north/south corridors.
- Speed reductions and truck restrictions on Main Street will increase the percentage of trucks on local roadways.
- The growth in traffic projected for the future is expected to create an unbalanced eastward development bias that will degrade existing north/south corridors.

2) Existing Roadway Configurations are not Compatible with Traffic Demands - Currently, many of the roadways in western Joplin experience above average crash rates, apparently due to roadway designs that were not meant to handle the increasing number and types of vehicles using them. Expected future growth and planned downtown pathway redistributions are expected to exacerbate this condition. The critical elements that define this problem are associated with:

- Some vital corridors in Joplin have above average crash rates.
- The design parameters of the roadways in western Joplin are appropriate for very low traffic volumes. As volumes increase the existing roads will increasingly become insufficient to accommodate users.

3) Community and Economic Development is Affected by Mobility Deficiencies - Unaddressed, the access discontinuities expected by the planned growth of Joplin will create circumstances that will negatively affect community and economic development. The critical elements that define this problem are associated with:

- The potential for negative community development consequences from not providing the fourth north/south corridor widely expected in the community's long-term planning.
- The potential for negative economic development consequences from failing to accommodate the large economic generators being developed in western Joplin.
- Interstate Route 44 is vital to the mobility needs of Joplin. Many of the Joplin interchanges have safety, operation, and geometric issues. There is a potential for negative community and economic development consequences from inefficiently utilizing the region's interchanges to Interstate Route 44.

The Important Travel Trends in Western Joplin

In order to quantify transportation problems; the project team utilized a traffic modeling approach that incorporated the two usable travel models which include the Joplin region. This approach utilized the enhanced model structure/calibration of the statewide model while retaining the focused nature of the city's model.

The important travel trends uncovered by the traffic modeling efforts include:

- The total annual detour miles traveled by the through trips entering Joplin at Route 171 and exiting the region at I-44 and Route 66 could be as high as 687,000 miles annually. The lost productivity at just these locations could be as high as 17,000 hours per year, roughly 2,100 work days.
- Without an appropriate western pathway, the growth of eastern Joplin will result in disproportionately higher traffic along the region's major eastern north/south corridors. For example:
  - Business Route 71 is expected to experience 6 percent more vehicles, without a western bypass.
  - Between Route FF and I-44, 2035 average daily traffic (ADT) on Business Route 71 will exceed 33,530 vehicles per day, without a western bypass.
  - Volumes on Main Street (between Zora Street and Route 66) will increase 30 percent over existing conditions, without a western bypass.
- Without a bypass, the increases in truck traffic on local roads are expected to be most extensive in the near west. Schifferdecker Avenue and Jackson Avenue/Lone Elm Road are expected to become major truck routes. In the future, the truck volumes are expected to exceed 12 percent of the total stream – volumes more typical of larger arterials and expressways. This is a substantial increase over existing conditions.
- Traffic volumes in 2035, at the Downstream Casino, are relatively unaffected by a typical western bypass. Two-way ADT entering the casino, without a bypass, is estimated as 11,525. Two-way ADT entering the casino, with a bypass, is estimated as 12,050.
- A western bypass will generate non-casino trips to Southwest Joplin. A typical/default bypass increases Route 66 traffic by 8,565. Roughly 50 percent of the bypass-related trips on Route 66 are expected to be on non-casino trips.
- The highest 2035 two-way ADT on a typical bypass is predicted to be 10,104.
- Without a bypass, traffic on the existing (local) roadways would increase substantially - more than doubling in some cases.

Next Steps

One thing that the purpose and need statement does not do is examine solutions. With the problems confronting the region well established, it is now appropriate for decision-makers to move forward with the development and evaluation of alternatives to solve these problems.

The technical data collected in the purpose and need statement will form the basis to evaluate which conceptual alternatives are superior. All things being equal, the solutions that best solve the transportation problems will be viewed as superior. This concept will guide the project through several iterations of developing and evaluating alternatives. The typical progression is from conceptual alternatives to reasonable alternatives to the preferred alternative. At each step, more detailed data is available to assist in the decision-making process. Within this process, public involvement and stakeholder involvement is vital. It allows MoDOT, and its partners, to better understand the needs, goals, and desires of those most closely affected by the project.

Section A: Introduction

1. Project Purpose

The Missouri Department of Transportation (MoDOT), the city of Joplin, and the Joplin Area Transportation Study Organization (JATSO) have cooperatively undertaken the development of this Joplin West Corridor Purpose and Need Statement. These organizations have determined that development trends are converging to create future conditions where the transportation system in western Joplin will be inadequate to support community needs. This study was initiated to investigate and define the magnitude of the transportation problems that may affect western Joplin. **Figure A-1** (below) and **Exhibit A-1** in **Appendix A** are general depictions of the area addressed in this report.

The definition of problems will allow for informed decision-making. This document is considered a "Pre-NEPA" document. It will not look at solutions and is not intended as a corridor-planning study. The specific goals of this purpose and need statement are to:

- Identify the transportation problems that affect western Joplin
- Establish the logical termini and independent utility for potential future projects
- Identify the evaluation criteria that will be important for determining how well future alternatives address the identified transportation problems
- Create a traffic model using the components of existing data with which to predict changes in traffic volumes

FIGURE A-1
General Vicinity Map



This document is organized into the following components:

Section A of this document discusses the project purpose, project background, logical termini, and independent utility (Introduction).

Section B of this document discusses the transportation problems identified and the critical elements that demonstrate the nature and extent of the problems (Transportation Problems).

Section C of this document discusses the draft parameters that may be useful in determining how well future alternatives address the identified transportation problems (Evaluation Criteria).

The appendices contain the technical and supporting data that underlies the analysis. **Appendix A** contains the exhibits mentioned in the text. **Appendix B** contains the project's important public involvement data. **Appendix C** contains the project's important planning data. **Appendix D** contains the data associated with the project's traffic model.

2. Project Background (Important Planning Documents)

There are several key research efforts that form the bedrock for investigating the transportation-related conditions affecting Joplin. These are:

- The I-44 Purpose and Need Statement
- The City of Joplin Comprehensive Development Plan Update
- The Joplin Downtown Revitalization Plan
- The 2007 Regional Origin and Destination (O/D) Survey
- The Joplin Metropolitan Area Long Range Transportation Plan

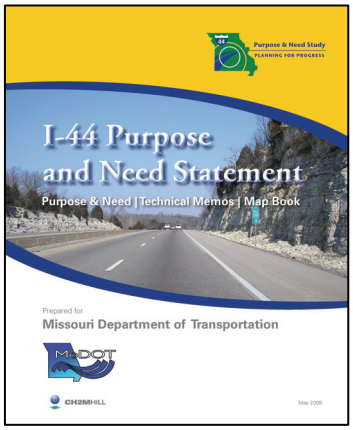
a. The I-44 Purpose and Need Statement

In 2007, using the I-70 experience as a guide, MoDOT began a statewide study of Interstate Route 44 (I-44) [1]. The goal was to determine the transportation problems associated with this major corridor and to lay the groundwork for potential future projects. The I-44 Purpose and Need Statement identified six main categories of transportation problems affecting I-44:

1) Roadway capacity is becoming inadequate for the expected demand.

2) There is a degrading safety environment on I-44.

3) Interchanges along I-44 have safety, operation, and geometric issues.



4) Increases in freight (trucks) are altering operations on I-44.

5) Evolving engineering standards result in many portions of I-44 being inconsistent with current design standards.

6) Improvements to I-44 will have both positive and negative impacts to some of the State's most valuable economic and natural resources. Balancing these impacts will be an important factor that must be considered when selecting solutions.

Many of these issues apply to the Joplin area. **Table A-1** provides a summary of the conclusions from the I-44 Purpose and Need Statement relative to the Joplin area.

[1] MoDOT committed itself to examining I-44 in a comprehensive way. Because of its statewide and national importance, I-44 was investigated in a manner that permits all problems to be well established/documented and all options to be fully considered. The first product of the Improve I-44 program was a purpose and need statement — a document defining the magnitude of the transportation problems. The statewide model was used extensively for this effort. See http://www.modot.org/i44planningforprogress/

Another element of the I-44 Purpose and Need Statement was to identify areas along I-44 where problems, conditions, and needs were demonstrably similar. These areas might logically be considered future study sections (FSS). The FSS that encompasses Joplin (FFS #1) begins at Exit 1 and extends approximately 19 miles eastward to Exit 18 (US Route 71 North). **Figure A-2** shows the proposed I-44 FSSs across Missouri. The I-44 Purpose and Need Statement concludes that, "*this portion of I-44 will be strongly influenced by the future expansion of Joplin. The rapid planned and expected growth in the Joplin light industrial business community is a factor through this area.*"

FIGURE A-2
Proposed Future Study Sections (I-44 Purpose and Need Statement)

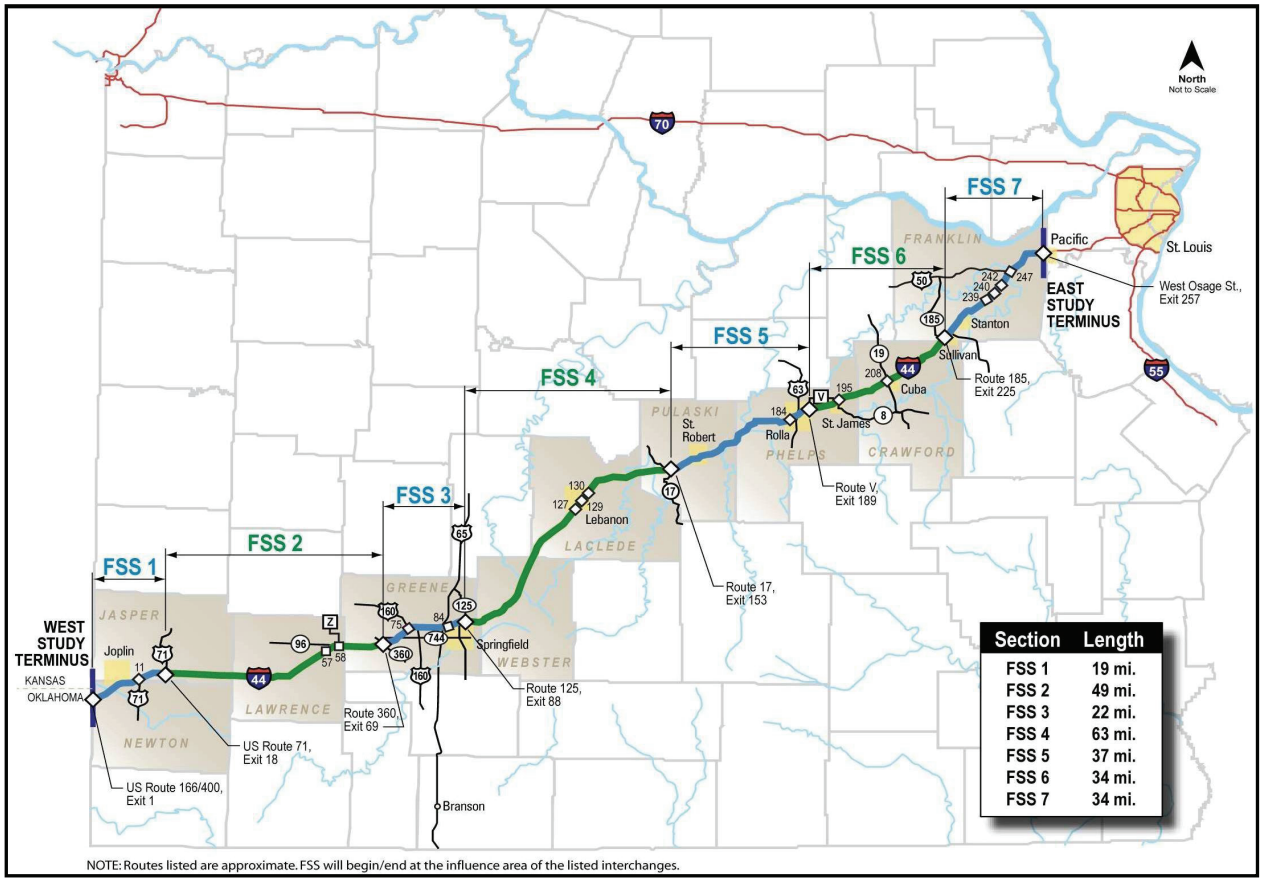


TABLE A-1

Transportation Problems Identified in the I-44 Purpose and Need Statement and Relevant Joplin-Area Data

I-44 Transportation Problems	Critical Elements/*Evaluation Criteria*	Joplin-Specific Data From I-44 Purpose and Need Statement	
		Location – Year	**Result (EB/WB)**
1) Roadway capacity on I-44 is becoming inadequate for the expected demand	Level of Service/ *LOS D (Rural) LOS E (Urban)*	Oklahoma to US-166 – 2035	E/E
		US 166 to Rest Area – 2035	F/E
		Rest Area to Weigh Station – 2035	E/E
		Route 43 to Route 86 – 2035	F/F
		Route 86 to Business 71 – 2035	F/F
		Route 66 to US 71 N – 2035	F/F
		US 71 N to 10th Rd – 2035	F/F
		10th Rd to Route 37 – 2035	F/F
		Route 37 to Route U – 2035	F/F
		Route U to Route 97 S – 2035	E/F
2) There is a degrading safety environment on I-44	Crash and Fatality Rates/ *Results Above Missouri Averages*	Newton County (2002 – 2006)	Urban Fatality Rate
		Newton County (2002 – 2006)	Rural Crash Rate
		Newton County (2002 – 2006)	Rural Fatality Rate
		Jasper County (2002 – 2006)	Rural Fatality Rate
3) Interchanges along I-44 have safety, operation and geometric issues	Interchange Crash Rates, Level of Service and Geometry/ *Crash Hotspots, Merge-Diverge LOS, and Design Sufficiency*	Exit 1, US 66	Operation
		Exit 4, Route 43	Geometric
		Exit 6, Route 86	Operation/Safety
		Exit 8, Business Rt. 71	Operation/Safety
		Exit 11, US 71 South, 249 North	Safety
		Exit 15, Loop 44	Operation
		Exit 18, US 71 North, 59 South	Operation/Safety
4) Increases in freight are altering operations on I-44	Trucks have wide-ranging effects on I-44: they exacerbate congestion, they are sensitive to design-related issues, and they constitute a substantial component of the crash environment. This applies to the Newton/Jasper County portions of I-44, as well the entirety of I-44.		
5) Evolving engineering standards result in portions of I-44 being inconsistent with current design standards	Design Elements Including Widths, Curvatures, Grades, Clearances and Conditions/ *Corridor-Specific criteria Relating to Insuring Safe and Efficient Movements*	Bridge – EB I-44 over Route 71	Poor Condition
		Bridge – WB I-44 over Route 71	Poor Condition
		Bridge – MO 66 over I-44	Poor Condition
6) Need to balance the access that I-44 provides with economic development and the preservation of natural resources	Acknowledgement/Support/ Preservation of Important Resources Associated with I-44/ *Seven important resources were identified for specific attention*	Historic Route 66	
		Branson	

b. The City of Joplin Comprehensive Development Plan Update.

In 2004, the City of Joplin updated its **Comprehensive Development Plan**. To focus stakeholders, the plan identified three themes through which to discuss all of the planning goals and zoning issues encompassed by an effective Comprehensive Development Plan. These organizing themes were:

1) Connection: how should circulation and movement be organized?
Among the goals were to reduce conflicts between modes, route different modes to appropriate pathways, and to facilitate/maximize non-motorized modes.

2) Animation: how should the social and civic activities that constitute the city be organized?
One goal was to create distinct and identifiable gateways and districts, as well as, in various ways, to strengthen the community's institutions.

3) Renewal: how should the city use its resources to maintain itself?
Among the goals were to provide incentives and institute policies to encourage appropriate civic revitalization/redevelopment.

Using these themes, the Comprehensive Development Plan provided an inventory and a needs analysis for the resources associated with the plan, such as housing, parks and recreation, land use. It also provided specific implementation strategies. **Table A-2** provides a summary of the Comprehensive Development Plan's themes, goals, and strategies. Relative to western Joplin, it can be inferred from the plan that there is generally adequate non-roadway infrastructure. For instance, electric, rail, and sewer systems are in place, but adequate roadways are needed for the anticipated/desired growth.

Another important element of the Comprehensive Development Plan was the introduction and conformity with the city's Downtown Revitalization Plan.

TABLE A-2	
Summary of Joplin Comprehensive Development Plan Update – Themes and Goals	
Theme: Connection (circulation and movement)	
	Goal: Reduce the vehicular and pedestrian conflicts in business districts and in neighborhoods
	Goal: Encourage pedestrian connection to and within residential areas
Theme: Animation (Organization of social and civic activities within the city)	
	Goal: Promote the use of signage, gateways, and landmarks to encourage on-street activity
	Goal: Strengthen retail activities and opportunities for expansion of commercial ventures in downtown
	Goal: Support residential stability by promoting and supporting living opportunities
	Goal: Promote affordable living by stabilizing existing neighborhoods
	Goal: Support social service programs and charitable housing opportunities
	Goal: Use landmarks and attractions to draw patrons to downtown and increase downtown activity
	Goal: Develop a major activity/community center within downtown
Theme: Renewal (how should the city maintain itself)	
	Goal: Invest in neighborhood incentives to revitalize targeted districts
	Goal: Develop strategies and incentives for renewal based on land use and compatibility
	Goal: Create opportunities for redevelopment and infill
	Goal: Use financial incentives to promote low- and moderate-income neighborhoods

c. The Joplin Downtown Revitalization Plan

Focusing on the area between 1st and 15th Streets/Grand and Sergeant Avenues, the Downtown Revitalization Plan initiated the use of the themes, later described in the Comprehensive Development Plan (see **Figure A-3**). It goes into great detail regarding the design changes necessary to accomplish the connection, animation, and renewal goals of the plan. Relative to the West Joplin Purpose and Need Study, the most important ramification is the desire to restrict trucks and make other alterations to operations that will convert downtown streets to a more pedestrian-friendly condition. Main Street is a focal point for these



Truck traffic is among the five top "connection" issues in the Downtown Revitalization Plan

"*Main street is currently designated as a truck route, carrying a great deal of truck traffic through downtown. In the past, alternative routes through downtown have been developed and enforced, but have not been successful because of limited turning radii, limited site distances ad conflicts created by uncontrolled intersections. An alternative truck route needs to be created to divert the trucks away from Main Street and downtown and minimize conflicts.*"

changes - specifically the portions maintained by Joplin (between Route FF and Murphy Boulevard). These changes will have ramifications to the entire transportation network, which will be discussed throughout this document. **Table A-3** summarizes the important issues associated with the Downtown Revitalization Plan.

d. The 2007 Regional Origin and Destination Survey

In March 2008, the final regional O/D survey was published. This cordon/intersect survey was an update to a study conducted in 1999. The purpose of the study was to determine the travel characteristics and trends in the Joplin region. Using 26 stations that encircled Joplin, O/D data was collected. This data provides important information for general applications, as well as for the construction of the travel model created this project. Details of the travel model are contained in **Section A.5** of this document. **Exhibit A-5** (**Appendix A**) is a visual summary of the O/D survey, showing survey stations and the relative volumes. Some relevant facts from the O/D survey include:

- 40 percent of trips passing through the cordon are work-related.
- 85 percent of the trips passing through the cordon

TABLE A-3

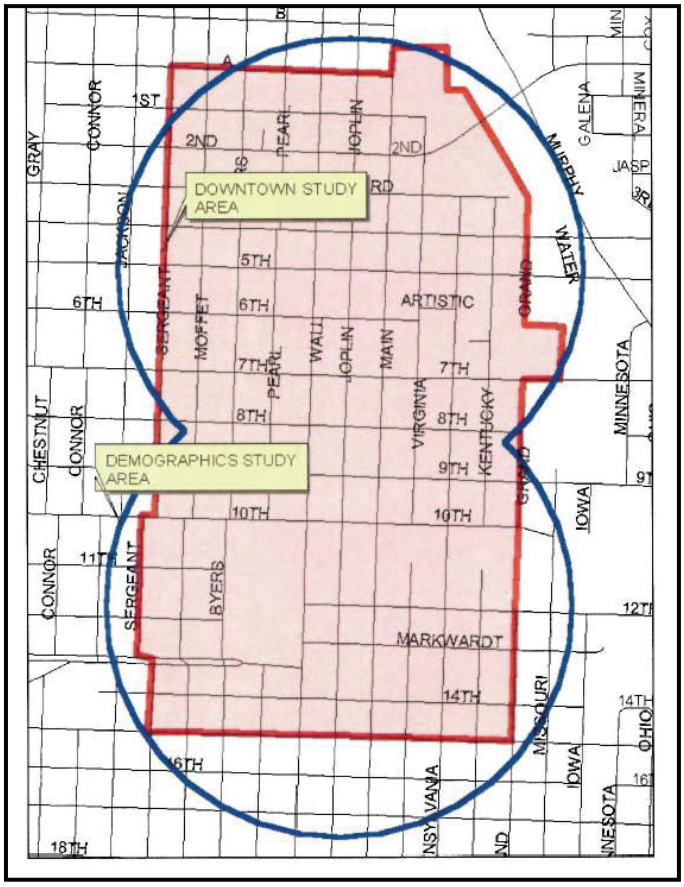
Summary of Downtown Issues and Concerns – Joplin Downtown Revitalization Plan	
Connection Issues	
	Off-street parking
	Nightlife and entertainment
	Consolidation of public buildings at 3rd and 4th Streets
	Truck traffic on Main Street
	Downtown identity
Animation Issues	
	Lack of a major activity center
	Unique identity for downtown
	Nightlife and entertainment
	Negative public perception of downtown
	Lack of cohesive land uses in downtown
Renewal Issues	
	Lack of major activity center
	On-street/off-street parking
	Brownfields
	Housing/lofts
	Incompatible uses

are by people who do not live in the Joplin area.

- 15 percent of the vehicles passing through the cordon are registered to a state other than Missouri, Oklahoma, or Kansas.
- 29 percent of the trips can be described as through (as opposed to local) trips.
- 14 percent of the vehicles entering/exiting the cordon are commercial trucks. The distribution of local and through truck trips is roughly 50/50.
- The largest source of trips to the cordon is I-44.

FIGURE A-3

Downtown Study Area from the Downtown Revitalization Plan



e. The Joplin Metropolitan Area Long Range Transportation Plan

The long-range transportation plan (LRTP) serves as the "blueprint" for the Joplin metropolitan area's transportation system through the year 2025. Urban areas are required by the Federal Highway Administration (FHWA) to have a Metropolitan Planning Organization (MPO) to coordinate long-range transportation planning. JATSO is the designated MPO for Joplin and the long-range plan represents its central organizing document. The broadest representation of the plan's intentions is its goals:

- Goal I – Provide for the development of a transportation system that is supported by and compliments land development and enhances community development
- Goal II – Provide for the development and maintenance of an efficient and safer transportation system for the movement of people and goods
- Goal III – Be aware of and be able to adapt to technological and federal transportation policy changes
- Goal IV – Provide for a balanced transportation system that provides a choice of travel modes for different individuals and activities

- Goal V – Develop transportation improvement projects consistent with budget constraints
- Goal VI – Provide a transportation system that enhances economic vitality in the Joplin area
- Goal VII – Provide a transportation system that addresses the needs of persons without access to automobiles, including persons of low income or persons with disabilities
- Goal VIII – Maintain low environmental impact from the transportation system within the metro area

In contrast, the narrowest/most-specific representation of the plan's intentions is the list of *programmed projects* and *long-range projects*. Programmed projects are often referred to as committed projects. They are projects that are to be constructed in the near-term; generally included on the Transportation Improvement Program (TIP) or included in other dedicated funding mechanisms. Long-range projects can include future projects that have funding sources that may be defined or undefined. The traffic model created for this project (see **Appendix D)** utilizes the programmed projects and long-range projects as the basis for predicting future traffic conditions. **Figure A-4** depicts the programmed and future projects for the LRTP. The key map depicting the programmed and future projects is included in **Appendix A** as **Exhibit A-2**.



Predicting the Future

The modeling of future conditions was based on the programmed projects and the long-range projects listed in the Joplin Metropolitan Area LRTP.

The design year (future case) for the project is 2035.

To assist in determining the transportation problems affecting western Joplin, the future condition was modeled with, and without, the western bypass depicted in the LRTP.

FIGURE A-4

Programmed and Future Projects in the Long Range Traffic Plan

TABLE 3-1 PROGRAMMED PROJECTS

No.	Route	From	To	Length (Mi.)	Funding	Description	Cost
1	BU 71/ Range Line	Intersection w/ Rt. 66/ 7th	-	0.4	Safety, STP-Enhancement	Add turn lanes and revise geometrics and signals	$1,836,000
2	BU 71/ Range Line	Intersection w/ 20th St.	-	0.2	Safety, STP-Enhancement	Add turn lanes and revise geometrics and signals	$3,453,000
3	66	Duquesne Rd.	Rt. 249	1.6	STP, STP-Enhancement	Right-of-way acquisition and upgrade to four lanes	$105,000
4	249	Rt. 66	20th St.	1.0	STP, MoDOT	Grading, paving and bridges to add lanes for dual divided high	$4,567,000
5	249	Rt. 171	Zora St	2.4	NHS, MoDOT	Grading and drainage for two lanes	$17,516,000
6	249	Rt. 171	Zora St	1.0	NHS, MoDOT	Grading, drainage, paving and interchange lighting	$8,816,000
7	249	Rt. 171	Zora St	2.4	NHS, MoDOT	Construction of bridges for two lanes	$16,994,000
8	Florida	Newman	Turkey Creek	0.25	Joplin Transporation Tax	Widening street to 3 lanes	$200,000
9	Florida	Bridge over Turkey Creek	-	-	Joplin Transporation Tax	Bridge construction	$1,000,000
10	Geneva	700'	2600' south of 20th	0.25	Joplin Transporation Tax	Purchase right-of-way and construction for Geneva extension	$1,200,000
11	32nd	Main	Jackson	0.5	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction	$2,687,500
12	32nd	Intersection w/ Main	-	-	50% 10 Year Tax; 50% MoDOT matching	Intersection Improvement	$4,300,000
13	Connecticut	Murphy	30th	1.4	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction	$6,450,000
14	Maiden	20th	32nd	1.0	Joplin Transportation 10 Year Tax		$2,150,000
15	Maiden	9th	17th	0.6	Joplin Transportation 10 Year Tax		$2,150,000
16	20th	Intersection w/ Main	-	-	Joplin Transportation 10 Year Tax	Intersection Improvement	$1,505,000
17	Connecticut	Viaduct at 26th	-	-	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction of overpass	$4,300,000
18	Schifferdecker	7th	32nd	2.0	Joplin Transportation 10 Year Tax		$2,687,500
19	Murphy	Main	7th	1.8	Joplin Transportation 10 Year Tax		$1,671,625
20	Zora	Intersection w/ Main	-	-	20% 10 Year Tax; 80% Federal Funds	Purchase right-of-way and construction for interchange	$15,050,000
21	26th	Maiden	Schifferdecker	1.0	Joplin Transportation 10 Year Tax		$1,881,250
22	Zora	Range Line	Main	2.0	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction for street widening	$2,150,000
23	Broadway/Buchanan	Florida	St. Louis	0.7	Joplin Transportation 10 Year Tax		$1,290,000
24	St. Louis	Broadway	Zora	1.5	Joplin Transportation 10 Year Tax		$1,827,500
25	CR190	32nd	I-44	-	Joplin Transportation 10 Year Tax		$2,150,000
						Total	$107,937,375

TABLE 4-3 LONG RANGE PROJECTS

No.	Route	From	To	Length (Mi.)	Funding	Description	Cost
101	West Bypass	171	I-44	16.0	Unfunded	New highway construction with limited access	$150,000,000
102	171	Pennel	43	3.1	State/Fed	Widen road (2 to 4)	$9,820,800
103	Zora	Range Line	249	2.4	Local/STP	Improve and widen (2 to 4)	$7,603,200
104	Zora	West Bypass	Main	4.4	Local/STP	Improve and widen (2 to 4)	$13,939,200
105	Schifferdecker	66	Zora	2.1	Local/STP	Widen road (2 to 4)	$6,720,000
106	Duquesne	32nd	N 17th	2.1	Unfunded	Widen/reconstruct road (2 to 4/5)	$7,207,200
107	Hall	N 17th	Hawthorn	5.4	Unfunded	New roadway construction	$22,809,600
108	Range Line	Interchange w/ I-44	-	2.7	State/Fed	Reconstruct interchange	$15,000,000
109	43	Intersection w/ 171		1.0	State/Fed	Access management and intersection improvements	$2,000,000
110	171	Hall	Main	0.4	State/Fed	Access management and intersection improvements	$400,000
111	Range Line	171	I-44	2.7	State/Fed	Access management, signal coordination and intersection improvements	$2,700,000
112	43/86	32nd	I-44	6.5	State/Fed	Access management, turn lanes and intersection improvements	$15,444,000
113	Fir	Peace Church	171	1.3	Local/STP	Reconstruction and addition of turning lane	$2,402,400
114	Fir	Intersection w/ 171	-	1.5	Local/STP	Intersection improvement	$1,500,000
115	Newman	Range Line	249	0.4	Local/STP	Reconstruction and addition of turning lane	$739,200
116	7th	Maiden	Black Cat	2.8	Local/STP	Add turn lanes	$5,174,400
117	20th	West Bypass	Schifferdecker	2.0	Local/STP	Reconstruction and addition of turning lanes	$3,696,000
118	32nd	JJ	Schifferdecker	2.6	Local/STP	Minor roadway widening	$4,804,800
119	St. Louis	Zora	171	1.9	Local/STP	Minor roadway widening and addition of turning lanes	$3,511,200
120	St. Louis	Murphy	Broadway	2.0	Local/STP	Minor roadway widening and addition of turning lanes	$3,696,000
121	Peace Church	Zora	Fir	2.6	Local/STP	Roadway improvement	$3,432,000
122	Black Cat	Newton	66	2.1	Local/STP	Widen to 3 lanes	$3,880,800
123	Zora	Int w/ Main	-	2.0	10 Year Tax; Unfunded	Purchase right-of-way and construction for interchange	$15,050,000
124	17th	Oronogo	e/o Prairie Flower	1.3	Local/STP/unfunded	New roadway construction	$4,656,960
125	Carl Junction Rd.	Madison	Rt D	0.3	Local/STP	New roadway construction	$1,108,800
126	44th	Overpass at I-44	-	0.6	State/Fed	New overpass construction	$5,000,000
127	Route Z (Pennel)	YY	Rt 171	0.4	Unfunded	Reconstruct/widen (2 to 3)	$739,200
128	CR190	Interchage with I-44		2.3	Unfunded	Interchange	$15,000,000
129	FF	US-71	CR 190	1.0	Unfunded	Reconstruct/widen (2 to 3)	$1,848,000
130	Route 96	JJ	D	9.1	Unfunded	Access Management	$2,000,000
131	Route D	Hawthorne Rd.	Rt 96	2.0	Unfunded	Reconstruct/new bridge	$3,000,000
132	Route D	E Ivy Road		0.4	Unfunded	Intersection Improvement	$500,000
133	Route FF	Reinmiller		0.4	Unfunded	Intersection Improvement	$500,000
134	32nd	Davis		0.6	Unfunded	Intersection Improvement	$500,000
						Total	$335,383,760

3. Study Area (Important Routes)

Broadly speaking, the Joplin area has three principal north/south and three principal east/west roadway travel corridors. These corridors form the backbone of the region's transportation system. The West Joplin Purpose and Need Statement utilized a *study area* that included the entirety of Newton and Jasper Counties. This large study area was necessary to appropriately encompass all data that would impact the project's focus area. The project's *focus* is the transportation problems of western Joplin. This is roughly everything west of Route 43/Main Street. These important routes will be discussed further in this section. **Exhibits A-1** through **A-3** depict the resources discussed in this section.



a. Principal North/South Corridors in Joplin

The major north/south corridors in Joplin, from west to east are Main Street/Loop 44/Route 43 (Main Street), Range Line Road/Business Route 71 (BR-71) and US Route 71/Route 249 (Route 249).

Main Street is the area's original north/south arterial. It is also the western-most major north/south corridor. It provides the shortest route between the Joplin Regional Airport (to the north) and Interstate Route 44 (to the south). Nearly all major civic and community assets are located along Main Street. Downtown Joplin is centered on and bisected by Main Street. The historic Sunshine Lamp District is also along Main Street. The configuration of Main Street varies widely from four-lane divided (grass median) sections to the south, five-lane urban sections though downtown, and two-lane highways to the north. Posted speed limits also vary (from 25 to 45 miles per hour [mph]). Signalized intersections are numerous. The portions of Main Street between Route FF (32nd Street) and Murphy Boulevard are maintained by Joplin, the balance is under MoDOT jurisdiction.



The BR-71 corridor is located approximately 3.5 miles to the east of Main Street. This corridor supports a newer generation of typical suburban roadside commercial development – big box outlets, strip malls and various restaurants. Miscellaneous capacity enhancements have occurred as the result of the growth of the city eastward. The typical configuration is a modern five-lane section with posted speed limits of 35 to 45 mph.

Route 249 has recently been completed and is approximately 5 miles east of downtown Joplin. The typical configuration is four-lane highway, with a center grassed median. Directional interchanges exist at the termini: Route 171 and I-44. Diamond interchanges exist at Route AA/Zora, Route TT/Newman and 7th Street/Route 66.

b. Principal East/West Corridors in Joplin

The major east/west corridors in Joplin, from north to south are Route 171, Route 66/7th Street and Interstate Route 44[2].

Route 171 is the northern-most highway in Joplin. It connects Asbury, through Gulfton and Carl Junction to Joplin. Route 171 is also a major commuter corridor between Joplin and Pittsburg, Kansas. Pittsburg is a small city approximately 25 miles from Joplin. It is the home of the Pittsburg State University and the most populous city in Crawford County. Through Joplin, Route 171 is the city's northern tier; connecting the Joplin Regional Airport, Webb City, and Route 249/Business Route 71. From Carl Junction to the airport, Route 171 is primarily a two-lane roadway. It transitions to a multilane freeway from that point to the northeast.

Route 66 is the area's original east/west arterial. The intersection of Main Street and Route 66/7th Street is the figurative heart of Joplin. One of the original federal routes, US 66 was established on November 11, 1926. It originally ran from Chicago to Los Angeles. Route 66 underwent many improvements and realignments over its lifetime. Ultimately it was decommissioned on June 27, 1985 and replaced by the interstate highway system. Nevertheless, the roadway had become ingrained into the psyche of the nation. In Joplin, configuration of Route 66 varies between two-lane rural highway and four-and five-lane urban sections.



Portions of Route 66 have been designated National Scenic Byways. In Missouri, upwards of 300 miles of old Route 66 remains. On July 10, 1990, the Governor of Missouri signed House Bill 1629 designating Old US Highway 66 as a historic highway in Missouri, and allowing MoDOT to post appropriate signs along the right-of-way. This joint project between MoDOT and the Route 66 Association of Missouri resulted in the installation of Historic Route 66 signs along the entire length of Historic Route 66 in Missouri. Another joint effort between MoDOT and the Route 66 Association of Missouri installed directional signs and arrows at strategic places to assist the traveling public in navigating Route 66 in Missouri[3].

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[2] Route FF/32nd Street roughly parallels I-44 and is also an important local east/west roadway. It is also roughly the boundary between Newton and Jasper Counties.

[3] While largely a volunteer effort, Route 66 casts a large economic footprint — mostly through the tourist trade. The Route 66 News lists 46 separate events (festivals/rallies/car shows) for 2008. Additionally, the road serves a quasi-pilgrimage route for antique car enthusiasts and those nostalgic for mid-20th century America. Along the way, visitors will find hotels, restaurants, museums, and other attractions. While the "dollars and cents" benefits of this type of heritage tourism are difficult to quantify, tourism is a powerful economic development tool. Tourism creates jobs, provides new business opportunities, and strengthens local economies. Cultural heritage tourism can have a tremendous economic impact on local economies. In addition to economic benefits like new businesses, jobs, and higher property values, tourism adds less tangible—but equally important—payoffs. A well-managed tourism program improves the quality of life as residents take advantage of the services and attractions that tourism adds. It promotes community pride, which grows as people work together to develop a thriving tourist industry.

In Jasper and Newton Counties, Interstate Route 44 is a four-lane divided highway. There are interchanges at US-166/US-400 (Exit 1), Route 43 (Exit 4), Main Street (Exit 6), BR-71 (Exit 8), US-71/Route 249 (Exit 11), US-71 (Exit 18), 100th Street in Parshley (Exit 22), Route 37 (Exit 26), and Route U (Exit 29).

c. Project Study Area and Focus Area

In order to determine the transportation problems associated with western Joplin, it was necessary to collect data from an adequately large area. For the purposes of this project, the study area was defined as the entirety of Jasper and Newton Counties. The focus area is the portion of the study area where transportation problems will be determined. This is roughly defined as the area west of Main Street, east of Galena, Kansas, North of Interstate Route 44 and south of Gulfton. **Exhibit A-3** shows the important resources discussed in this Purpose and Need Statement.



Initial Stakeholder List

Carl Junction School District
Joplin School District
Mid Central Contractors
Jasper County Water Supply District 1
Dean's Cabinet Shop
Pittsburg State University
Downstream Casino
Quapaw Tribe
Penn National Casino
FMC west
St. John's Hospital
Freeman Hospital
Jasper County
Newton County
Joplin Special Road District
Joplin Area Chamber of Commerce
Carl Junction Special Road District
Joplin Area Transportation Study Organization
Joplin Regional Airport
Webb City, MO
Reddings Mill, MO
Loma Linda, MO
Galena, KS
Kansas Department of Transportation (KDOT)
Oklahoma Department of Transportation (OKDOT)
Will Rogers Turnpike Authority
Wildwood Ranch

4. Summary of Public Outreach

The West Joplin Purpose and Need Study has been developed in accordance with FHWA Regulation 23 CFR 771, the procedures outlined in the FHWA Technical Advisory T6640.8A, FHWA's Purpose and Need Policy Memorandum dated September 18, 1990, and the joint FHWA/FTA Memorandum dated July 23, 2003 and Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) Section(s): [6002-6005, 6007, 6009, 6010]. Compliance with these regulations requires an effective public involvement program. The key elements of this project's public involvement include:

- The establishment of a collaborative project team, MoDOT, the city of Joplin, and JATSO have cooperatively undertaken the development of this purpose and need statement. The most visible outreach has been that representatives from each group participated in biweekly progress meetings. Agendas and meeting summaries of these meetings are available in the project's administrative record. Additionally, the representatives of the project team participated with data collection, research, establishment of community goals, and model development. This level of involvement allowed for a high level of awareness within each member organization.
- A list of stakeholders was developed and a dialog established with these groups. The identified stakeholders included adjacent municipalities, important institutions, and other potentially interested decision-makers. Outreach began with an introductory letter. The letter sought to inform stakeholders about the nature of the project (identification of transportation problems) and establish a mechanism for interested parties to get involved and/or provide

input. Follow-ups to each of the stakeholders were conducted to ensure that the appropriate contacts were established. This approach yielded important data and general expressions of support.

- The commitment to present the draft results of this study to interested governmental agencies in venues open to the public. On January 15th, 2009, a presentation was given to JATSO. Other opportunities are being investigated.

Appendix B contains important outreach materials, including a summary of the public involvement plan, outreach letters, news coverage, a summary of stakeholder input, and drafts of the project-related presentations conducted.

5. Traffic Modeling for the West Joplin Purpose and Need Statement

In order evaluate the transportation problems; the project team utilized a traffic modeling approach that incorporated the two usable travel models which include the Joplin region.



Summary of Traffic Model Development for the West Joplin Purpose and Need Statement

- Augment area model by adding links to highway network, adding zones in Joplin, and isolating Joplin as an independent modeling study area (moating)
- Allocate the statewide model zone quantities to the Joplin subzone zone system for review by the project team
- Review/revise network assumptions from Joplin model
- Build network and zone database and input new Joplin focus-area model
- Complete "moating", run process of ignoring out-of-area model and review outputs
- Develop external station projection method
- Update network assumptions
- Input future network and land use assumptions for future conditions

The first model is the Joplin model developed in the late 1990s. It is based on the quick response methods (documented in NCHRP 185/365) and implemented using QRS II® software. For this project, model roadway networks developed for this model have already been converted from QRS II® to Transcad® format. This represents the Joplin area in detail and is comprised of about 200 traffic analysis zones. **Exhibit A-4** shows the traffic area zones (TAZs) network. Generally, networks are detailed to the minor arterial level and also represent significant collector facilities.

The second model is the Missouri statewide traffic model. It was developed as a statewide planning tool with a network and zone system representing the entire state of Missouri. This model executes on the Transcad® software platform and includes both a process and data management interface to simplify model execution for the user. While the statewide model is a newer effort, it is cumbersome because of the scale of the network, the number of zones, and its reliance on statewide calibration.

The traffic modeling approach for the West Joplin Purpose and Need Statement was to create a subarea model within the statewide model by isolating Joplin. This required the use of the

cordon intercept data (from the 2007 Regional O/D Survey) to update the external movements. This approach allowed application of the statewide model framework to the Joplin subarea without substantive changes. It also allowed use of tools previously developed for the I-44 Purpose and Need Statement and other Transcad® based efforts.

This approach represents the best of both worlds because the model structure/calibration of the statewide model is captured while retaining the focused nature of the city model. Because this application may be something that would be of continuing interest to MoDOT or local users, it is included in this report as **Appendix D.** The design year for the traffic projections is 2035**.**

6. Logical Termini and Independent Utility

FHWA regulations (23 CFR 771.111(f)) establish criteria for projects in regards require that an action evaluated in an environmental impact statement or finding of no significant impact shall:



Logical Termini (North): Route 171

- Route 171 is the major east/west corridor, north of Joplin
- This area represents the northern extent of Joplin. Immediately to the west is Carl Junction. Immediately to the east is Webb City. In the northeastern quadrant of the Route 171/Route 43 intersection is the Joplin Regional Airport.

- Connect logical termini and be of sufficient length to address environmental matters on a broad scope. Logical termini is typically defined as connecting points with known features (land uses, economic areas, population concentrations, cross route locations, and so forth) at either end of a proposed transportation route that enhance good planning and serve to make the route useable. Logical termini are considered rational end points for a transportation improvement.
- Have independent utility or independent significance; that is, be usable and be a reasonable expenditure even if there are no additional transportation improvements in the area. A project is typically considered to have independent utility if it could be constructed absent the construction of other projects in the area. Portions of a multiphase project that depend upon other phases of the project do not have independent utility.
- Additionally, the development of the project should not restrict consideration of alternatives for other reasonably foreseeable transportation improvements, such as organizing the project force a new alignment solution at the expense of less extensive solutions such as major safety improvements or other local projects.



Logical Termini (South): Interstate Route 44

- Interstate Route 44 is the major east/west corridor, south of Joplin.
- Existing interchanges in this area include exit 1 (US Route 166/400), exit 4 (Route 43) and exit 6 (Route 43/Main Street).

Based on the assumptions described in this section, the logical termini proposed for the West Joplin Purpose and Need Study are the major east/west corridors that bound Joplin. To the north, this is the Route 171. To the south, this is Interstate Route 44 – between exits 1 and 6. Based on existing data, these termini should adequately comply with 23 CFR 771.111(f).

Section B: Transportation Problems

The main focus of this Purpose and Need Statement is to identify the transportation problems associated with western Joplin. These problems will be discussed in this section and can be summarized as:



This Chapter Identifies the Transportation Problems and Critical Elements Affecting Western Joplin

The *Transportation Problems* are the overarching concepts that define the deficiencies that affect the study area.

The *Critical Elements* are the important trends that demonstrate the nature/extent of the transportation problems.

1. Proposed Access Goals for Main Street Create Discontinuities - Joplin envisions a community where current access patterns better support community goals. For example, the region's major planning documents are focused on providing a more vibrant, more pedestrian-friendly downtown. To achieve these goals, vehicular traffic will be constrained. This will create discontinuities that represent transportation problems that will ultimately need to be addressed.

2. Existing Roadway Designs are not Compatible with Traffic Demands - Currently, many of the roadways in western Joplin experience above average crash rates, apparently due to roadway designs that were not meant to handle the increasing number and types of vehicles using them**.** Expected future growth and planned downtown pathway redistributions are expected to exacerbate this condition.

3. Community and Economic Development is Affected by Mobility Deficiencies – Unaddressed, the expected access discontinuities and traffic growth within western Joplin will create circumstances that will negatively affect community and economic development.

Each of these transportation problems will be evaluated in an individual subsection. The critical elements, trends that define the transportation problem, will also be developed in this chapter. This analysis of the critical elements will form the majority of the discussion. The analysis primarily utilizes available data to quantitatively and qualitatively define the critical element and, by extension, the transportation problem.



Another important goal of this purpose and need statement is to define the criteria which future project planners can use to develop alternatives to solve these problems and to evaluate their efficacy. The *Evaluation Criteria* are discussed in **Section C**.

While solutions to the transportation problems are beyond the scope of the purpose and need statement, the critical elements logically point toward evaluation criteria. Evaluation criteria are those metrics that can be used to evaluate how well potential solutions (alternatives) perform in regards to solving the identified problems. **Section C** of this report focuses on the evaluation criteria. **Table B-1** is a summary of the problems, critical elements, and evaluation criteria for the West Joplin Purpose and Need Statement.

TABLE B-1

West Joplin Purpose and Need Summary: Problems, Critical Elements, and Evaluation Criteria

Transportation Problems	Critical Element	Evaluation Criteria
1. Proposed Access Goals for Main Street Create Discontinuities Joplin envisions a community where current access patterns better support a more pedestrian-friendly downtown. To achieve these goals, vehicular traffic will be constrained on roadways it maintains, such as Main Street. This will create discontinuities that represent transportation problems that will ultimately need to be addressed.	Speed reductions and truck restrictions on Main Street will force through traffic to take another north/south corridor.	To what extent do alternatives minimize the detour impacts of restrictions through Main Street?
	Speed reductions and truck restrictions on Main Street will increase the percentage of trucks in the traffic stream, on local roadways.	To what extent do alternatives adequately remove truck traffic from local pathways?
	The growth in traffic projected for the future is expected to create an unbalanced eastward development bias that will degrade existing north/south corridors.	To what extent do alternatives provide for sustainable growth on existing north/south corridors through Joplin?
2. Existing Roadway Designs are not Compatible with Traffic Demands Currently, many of the roadways in western Joplin experience above average crash rates, apparently due to roadway designs that were not meant to handle the increasing number and types of vehicles using them. Expected future growth and planned downtown pathway redistributions are expected to exacerbate this condition.	Records indicate that some vital transportation corridors in Joplin have above average crash rates.	To what extent do alternatives address known traffic hotspots?
	A review of existing conditions concluded that the design parameters of the roadways in western Joplin are appropriate for very low traffic volumes. As volumes increase the existing roads will increasingly become insufficient to accommodate users.	Are the roadway configurations adequate to accommodate predicted traffic (especially in regards to truck traffic)?
3. Community and Economic Development is Affected by Mobility Deficiencies Unaddressed, the expected access discontinuities and traffic growth within western Joplin will create circumstances that will negatively affect community and economic development.	There is a potential for negative community development consequences from not providing the fourth north/south corridor widely expected in the community's long-term planning. Specifically, inappropriate traffic on local roadways will increase.	To what extent do alternatives support the community's development goals?
	There is a potential for negative economic development consequences from failing to accommodate the large economic generators being developed in western Joplin. Specifically, inadequate capacity will constrain economic development.	To what extent do alternatives appropriately balance northern trips to southwestern Joplin?
	Interstate 44 is vital to the mobility needs of Joplin. Many of the Joplin interchanges have safety, operation, and geometric issues. Without a western north/south corridor, traffic utilizing these interchanges will increase. Consequently, there is a potential for negative consequences from inefficiently utilizing the I-44 interchanges.	To what extent would alternatives improve the I-44 interchanges?"

1. Proposed Access Goals for Main Street Create Discontinuities

One of the goals of transportation planning is to align the transportation network with the community it serves. The planning efforts undertaken in Joplin have consistently proposed a future where the transportation system complements land development and enhances the community. Joplin envisions a pedestrian-friendly environment that involves limiting inappropriate vehicles from traveling in sensitive areas and promoting further development of distinct neighborhoods. This vision is illustrated in all of the major planning documents:

The *Joplin Comprehensive Plan* includes the following goals that focus on access:

- "Reduce the vehicular and pedestrian conflicts in business districts – such as downtown by minimizing truck traffic – and in neighborhoods."
- "Encourage pedestrian connections to and within residential areas."
- "Use landmarks and attractions to draw patrons to downtown and increase downtown activity."

Table A-2 provides a comprehensive summary of the plan's goals.

The *Joplin Downtown Revitalization Plan* identifies the following issues that focus on access:

- Truck traffic on Main Street

Table A-3 provides a more comprehensive summary of the plan's goals.

The *Joplin Area LRTP* includes the following goals:

- Goal II - Provide for the development and maintenance of an efficient and safer transportation system for the movement of people and goods
- Goal IV – Provide for a balanced transportation system that provides a choice of travel modes for different individuals and activities
- Goal VII – Provide a transportation system that addresses the needs of persons without access to automobiles, including persons of low income or persons with disabilities



Transportation Problem:
Proposed Access Goals for Main Street Create Discontinuities

Planning in Joplin envisions a community where current access patterns better support community goals. For example, the region's major planning documents focus on providing a more vibrant, more pedestrian-friendly downtown. To achieve these goals, vehicular traffic will be constrained. This will create discontinuities that represent transportation problems that will ultimately need to be addressed.

The critical elements that define this problem are associated with:

- Speed reductions and truck restrictions on Main Street that force through traffic to take another north/south corridor
- Speed reductions and truck restrictions on Main Street that increase the percentage of trucks in the traffic stream and on local roadways
- Projected traffic growth for the future is expected to create an unbalanced eastward development bias that will degrade existing north/south corridors

These goals are represented by the list of *programmed projects* and *long-range projects* identified in the plan. Projects that pertain to western Joplin and the access goals discussed in this purpose and need statement are:

- Programmed projects on Schifferdecker Avenue and Murphy Boulevard (projects 18 and 19)
- Future projects on Schifferdecker Avenue, Peace Church Avenue, and Black Cat Road (projects 105, 121, and 122)
- A western north/south bypass of western Joplin is also a future project (101)

Figure A-3 provides the complete list of programmed and future projects from the LRTP.

The travel demand model created for this project (see **Appendix D)** utilizes the programmed/long-range projects, as well as Main Street speed reductions and truck restrictions as the basis for predicting future traffic conditions. These alterations foreshadow access discontinuities. Based on this evaluation, the following access discontinuities were identified:

a. Critical Element: Speed reductions and truck restrictions on Main Street will force through traffic to take another north/south corridor

All of the major north/south corridors in Joplin are to the east of Main Street. Consequently, any through traffic bound for the west of Joplin will be forced to take a circuitous route. This type of detour may represent hundreds of thousands of miles of extra travel and thousands of hours in lost productivity, annually.

The longest of these circuitous trips would be to vehicles coming into the Joplin area from the northwest, destined for points west via I-44 and Route 66. According to the Joplin 2007 Regional O/D Survey, stations 314 through 315 are the northwestern most portion of the survey's cordon (see **Exhibit A-5**).

Station 314 is on Route 171. The O/D Survey estimated a 24-hour count of 4,700 vehicles entering at station 314. Thirteen percent (615) of station 314's traffic are through trips. Of the station 314 through trips, 40 vehicles exit the Joplin area at the western I-44 station (station 305) - roughly 1 percent of all trips. Assuming all of these vehicles abandon Main Street, the additional miles traveled can be significant. If Business Route 71 is taken, roughly 51,000 detour miles will be traveled annually. Given the signalization on Business Route 71 and the projected volume increases, the newly opened Route 249 may be a more attractive alternative. If all of the through traffic destined for I-44 westbound takes Route 249, the annual detour mileage will be roughly 105,000 miles. The truck stream on Route 171, at station 314, is amongst the highest in the region; between 12 and 13 percent of the



Speed reductions and truck restrictions on Main Street will force through traffic to take another north/south corridor

The total annual detour miles traveled by the through trips entering at O/D survey stations 314 and 315 and exiting the region at I-44 and Route 66 is estimated to be between 198,000 miles and 687,000 miles (depending on which detour route is taken).

At an average speed of 40 mph, the lost productivity at just these locations could be as high as 17,000 hours per year, roughly 2,100 work days.

traffic stream are commercial trucks. On an annual basis, this may represent between 6,000 and 13,000 miles of additional commercial truck traffic in the Joplin area, depending on the detour route.

Station 315 is at Route 43/Main Street, north of Route 171. The O/D Survey estimated a 24-hour count of 8,484 vehicles entering at station 315. The total number of through trips at this station is 656, with 57 vehicles exiting the Joplin area at the western I-44 (station 305). Assuming all of these vehicles abandon Main Street, the additional miles traveled can be significant. If Business Route 71 is taken, roughly 73,000 detour miles will be traveled annually. Given the signalization on Business 71 and the projected volume increases, the newly opened Route 249 may be a more attractive alternative. If all of the through traffic destined for I-44 westbound takes Route 249, the annual detour mileage will be roughly 153,000 miles. At station 315, 656 of the 8,484 vehicles in the 24-hour count are commercial trucks. Assuming the same percentage of them exits the area at I-44 (west), on an annual basis this may represent between 6,000 and 12,000 extra commercial truck traffic miles in the Joplin area.

The same type of route choice can be seen in through trips from Station 314 and 315, exiting the Joplin area on Route 66 (station 309). Using the data in the O/D survey, roughly 96,000 extra miles of travel may result from vehicles intending to use Route 66 to access destinations to the west of Joplin, but forced to abandon Main Street (in favor of BR-71) because of speed reductions and truck restrictions. If the longer detour at Route 249 is used, the extra miles of travel would be much higher (407,000 miles).

From just these locations, the total annual detour miles traveled by the through trips entering at O/D survey stations 314 and 315 and exiting the region at I-44 and Route 66 is estimated to be between 198,000 miles and 687,000 miles (depending on which detour route is taken). Other similar detour pathways may also exist, but are more difficult to quantify. Another consideration when appraising these numbers is that driver behavior is difficult to predict and some of the assumptions used in these calculations may be overly simplistic. Nevertheless, the implementation of speed reductions and truck restrictions on Main Street will force through traffic to take another north/south corridor. This discontinuity represents a transportation problem that will ultimately need to be addressed.

b. Critical Element: Speed reductions and truck restrictions on Main Street will increase the percentage of trucks in the traffic stream on local roadways

The idea of prohibiting trucks from Main Street has been a consistent theme within the Joplin planning community for years. The logic is compelling; it is difficult to create a pedestrian-friendly town center when large, lumbering, and loud trucks dominant the streetscape. Of course, that begs the question: “If not Main Street, where”? Not all of the trucks that utilize Main Street are like those discussed above and will simply take another north/south route to exit the Joplin-area. Many more are on local trips. They’ll need to make deliveries, go to job sites, get home – all of the things that make a city run. It seems inevitable that these trucks will migrate to roads that were not intended to facilitate truck traffic. This discontinuity is a transportation problem that will need to be addressed for the community’s goals to be achieved without creating unacceptable unintended consequences.

Based on the Joplin 2007 Regional O/D Survey, a total of 9,326 trucks were reported to be on local trips each day. The O/D survey utilized an internal zone system that divided the study area into 166 internal zones. **Exhibit A-4** depicts this zone system. The top ten internal zones produced roughly 40 percent (3,819) of the total local truck trips. **Table B-2** lists these zones.

Most of the top truck-trip producing zones are located along the region's major corridors such as I-44[1]. Work-related trips are the overwhelming purpose of truck trips. Anywhere that conducts business can be expected to require truck access, including Main Street businesses. If Main Street is effectively closed to them, adjacent roadways will need to be used.

FIGURE B-1

Typical views of truck traffic on Main Street.



TABLE B-2

Top 10 Zones for Local Truck Trip Production

Rank	Internal Zone	Daily Local Truck Trips	Zone Description
1	157	1,237	South of I-44, between interchanges at Exit 1 and 4
2	158	748	North of I-44, between interchanges at Exit 1 and 4
3	152	517	Southwestern quadrant of I-44 interchange at Exit 11
4	149	273	Northwestern quadrant of I-44 interchange at Exit 11
5	141	234	Business Route 71 at Route FF
6	142	210	Business Route 71 at Route FF
7	62	164	Northwest quadrant of Route 66/249 interchange

[1] This seems to suggest that these zones also contribute to the much more numerous through trip truck traffic. Of the total daily truck traffic (26,999), 17,673 were identified as through trips.

TABLE B-2

Top 10 Zones for Local Truck Trip Production

Rank	Internal Zone	Daily Local Truck Trips	Zone Description
8	137	153	Business Route 71 at Route 66
9	95	146	Route 66 at western edge of metropolitan area
10	106	137	Main Street at 20th

Source: 2007 O/D Survey, ETC Institute

Based on travel demand modeling, the overall percentage of trucks in the traffic stream will grow proportionately with general traffic. However, on some local roadways adjacent to Main Street, the percentage of trucks will increase (between the base case and the future case) as speed reductions and truck restrictions take effect. To quantify this, the percentage of trucks was calculated on the minor north/south corridors adjacent to Main Street during the base case and for the corresponding future conditions. Using the percentage of trucks eliminates the effects of general traffic growth. **Table B-3** presents a summary of this data.

TABLE B-3

Percentage of Trucks along Minor North/South Corridors without a Bypass

Location	Percentage of Trucks (Medium and Heavy Trucks)	
	Base Case (Existing)	Future Case (2035)
Black Cat at Fountain	5%	1.2%
Black Cat at Route 66	6%	3.4%
Black Cat at 20th	0%	0%
Schifferdecker at Zora	9%	13%
Schifferdecker at Route 66	8.5%	13.0%
Schifferdecker at 20th	8.6%	14.2%
Jackson/Lone Elm at Zora	5.8%	5.9%
Jackson/Lone Elm at Route 66	8.5%	12.7%
Jackson/Lone Elm at 20th	8.6%	14.2%
Main Street at Zora	7.3%	6.5%
Main Street at Route 66	5.8%	0.5%
Main Street at 20th	6.5%	3.6%
St. Louis at Zora	4.7%	5.8%
St. Louis at Route 66	7.3%	8.0%
St. Louis at 20th	12.7%	10.4%

Black Cat Road, Schifferdecker Avenue, and Jackson Avenue/Lone Elm Road are located west of Main Street. St. Louis Avenue is east of Main Street. These represent local roads that traverse, in a general north/south direction, the areas adjacent to Main Street. These are representative of arterial and collector roads. Largely recognized as neighborhood streets, the quality-of-life they support would be negatively impacted by increases in truck traffic. Based on the travel demand modeling conducted for this project (without a typical/default western bypass), both the absolute number of trucks and the percentage of trucks in the traffic stream are predicted to increase on these roads.

Without a western bypass, the increases in truck traffic on local roads are expected to be most extensive in the near west, with Schifferdecker Avenue and Jackson Avenue/Lone Elm Road becoming major truck routes. In the future, the truck volumes are expected to exceed 12 percent of the total stream – volumes more typical of larger arterials and expressways. This is a substantial increase over existing conditions. In some cases, the percentage of trucks on the local roadways will increase by 65 percent (from 8.6 percent to 14.2 percent). Not all locations shown on **Table B-3** are predicted to have this degree of increase, but the data identifies a general trend.

On the eastside of Main Street, increases in truck traffic are not easily definable. The general trend shown at Schifferdecker Avenue and Jackson Avenue/Lone Elm Road does not appear at St. Louis Avenue. Of course, a block-by-block analysis of the roadways to the east of Main Street may be able to uncover a more subtle trend in regard to truck traffic increases.



Speed reductions and truck restrictions on Main Street will increase the percentage of trucks on local roadways

Truck traffic is predicted to grow in proportion with overall traffic.

On some north/south corridors to the west of Main Street, without a western bypass, the percentage of trucks is expected to increase substantially. These are considered neighborhood streets whose quality-of-life would be negatively impacted by increases in truck traffic.

Local truck traffic is essential to the operation of any city. For Joplin, the implementation of speed reductions and truck restrictions on Main Street will force truck traffic to other routes. On some north/south corridors to the west of Main Street, without a western bypass, the percentage of trucks is expected to increase substantially. Increases in truck traffic would negatively impact the quality-of-life of these neighborhood streets. This discontinuity represents a transportation problem that will ultimately need to be addressed.

c. Critical Element: The growth in traffic projected for the future is expected to create an unbalanced eastward development bias that will degrade existing north/south corridors

Major north/south transportation improvements in Joplin have been concentrated in the eastern half of the region. For example, Business Route 71 has been developed to its existing condition over the past 20 years. Among the recent improvements along Business Route 71 have been the multiple lanes with coordinated signals and improved intersections. Route 249 has been recently completed; it represents a controlled access corridor between Route 171 and I-44 with interchanges at the major Joplin east/west corridors. This development represents the completion of the long-range vision for the areas to the east of Joplin. With this complete, the long-range transportation planning process has started to focus on the needs of western Joplin. Without a western bypass, the expected traffic growth and planned alterations to traffic patterns

will result in a situation where the increases in traffic along the major eastern north/south corridors will begin to exceed the expected levels, perhaps leading to degraded service.

The two-way ADTs for the major north/south corridors are presented in **Table B-4**. This data is the summary of data from the traffic modeling conducted for the West Joplin Purpose and Need Statement (see **Exhibits A-6, A-7,** and **A-8** in **Appendix A**).

This data suggests that Route 249 is relatively unaffected by a western bypass. Whereas the volume of traffic on Route 249 increases tremendously in the future (roughly doubling in terms of its weighted corridor average), the difference between the future cases (with and without a typical/default western bypass) is nearly identical. On the other hand, Business Route 71 and Main Street are expected to experience greater impacts.



The growth in traffic projected for the future may be expected to degrade existing north/south corridors

Without an appropriate western pathway, the growth of eastern Joplin will increase resulting in disproportionately higher traffic along the major eastern north/south corridors. For example:

- Overall, Business Route 71 is expected to experience 6 percent more vehicles without a western bypass – 28,350 versus 26,800 vehicles.
- Between Route FF and I-44, 2035 ADT on Business Route 71 will exceed 33,530 vehicles per day, without a western bypass (the busiest segment in Joplin).
- Without a bypass, volumes on Main Street (between Zora Street and Route 66) increase substantially over existing conditions (19,470 versus 14,940).

Overall, on a length-weighted corridor basis[2], Business Route 71 is expected to experience 6 percent more vehicles without a western bypass – 28,350 versus 26,800 vehicles. On this length-weighted corridor basis, the future ADT with a bypass would be nearly identical to existing conditions – 26,800 versus 26,680. Without a bypass, two-way ADT is predicted to be as high as 33,530. Relevant segment conclusions include:

Business Route 71 between Route FF and I-44
This segment would be the busiest in Joplin, with as many as 33,530 vehicles per day. A typical/default bypass is expected to reduce these volumes by about 7 percent (31,280). Of course, the operational efficiency of a complicated roadway such as Business Route 71, is influenced by numerous individual movements. Nevertheless, reducing total volumes on the busiest road in the system should generally be considered beneficial.

Business Route 71 between Route 171 and Zora Street
The typical/default bypass is expected to reduce Business Route 71 dramatically. In this area, the nonbypass scenario predicts nearly 20 percent more vehicles on Business Route 71 than under the bypass scenario in 2035 (19,340 versus 16,250). In either case, the future condition is expected to have lower volumes than existing conditions (22,020). Undoubtedly this is the result of the increased utility of Route 249 in the future. As was mentioned in the discussion of detour-related impacts, vehicles will increasingly find

[2] The corridor's ADT is calculated by weighting the model generated ADTs in accordance with the length of the roadway represented.

Route 249 more attractive – sometimes because of Main Street restrictions and sometimes because of Business Route 71 congestion.

Business Route 71 between Route 66 and Route FF
This segment is expected to experience the largest growth (both absolutely and on a percentage basis). Interestingly, this segment seems unaffected by a bypass (32,710 without a bypass/32,740 with a bypass).

Traffic volumes on Main Street are influenced by several factors. On the one hand, truck and speed restrictions will tend to diminish use. On the other hand, growth and proximity will continue to attract users. On a weighted corridor basis, Main Street is expected to experience roughly 17 percent more vehicles in future; with or without a typical/default western bypass. On a segment basis, the impacts are more subtle and complex.

TABLE B-4

Two-Way ADTs for Major North/South Corridors

	Main Street			Business Route 71		
	Existing	**Without Western Bypass (2035)**	**With Western Bypass (2035)**	**Existing**	**Without Western Bypass (2035)**	**With Western Bypass (2035)**
Route 171 to Zora Street	18,740	20,970	23,050	22,020	19,340	16,250
Zora Street to Route 66	14,940	19,470	14,350	29,570	31,440	30,060
Route 66 to Route FF	15,210	19,580	17,520	27,080	32,710	32,740
Route FF to I-44	19,630	25,210	23,190	31,220	33,530	31,280
Corridor Weighted Average	**16,890**	**20,930**	**21,140**	**26,680**	**28,350**	**23,800**

1

TABLE B-4 (CONT)

Two-Way ADTs for Major North/South Corridors

	Route 249		
	Existing	**Without Western Bypass (2035)**	**With Western Bypass (2035)**
Route 171 to Zora Street	N/A	10,950	11,030
Zora Street to Route 66	2,610	12,380	12,500
Route 66 to I-44	9,620	21,280	21,120
I-44 to Route FF	20,520	24,390	23,010
Corridor Weighted Average	**7,480**	**15,130**	**15,040**

Main Street between Route 171 and Zora Street
Both future scenarios increase volumes over existing conditions; the bypass scenario is about 10 percent higher than the nonbypass scenario (23,050 versus 20,970). This seems to be the result of interplay between the bypass and increasingly important Zora corridor. The lack of restrictions on this portion of Main Street may also be a factor. Overall, this result also seems to support the notion of economic development capacity of an additional major north/south corridor in Joplin.

Main Street between Zora Street and Route 66
On this segment, the bypass scenario should experience reduced usage, becoming the lowest volume segment in the Main Street corridor (14,350). This is the expected result of the implementation of speed and truck restrictions. Without a bypass, volumes increase substantially over existing conditions (19,470 versus 14,940). This change in Main Street usage is consistent with the community's goals of a more pedestrian-friendly downtown. Vehicles will increasingly use alternate routes. These trips represent a discontinuity and form a critical element of the transportation problems that affect western Joplin.

Main Street between Route 66 to Route FF
South of downtown, the implementation of restrictions is also predicted to result in lower volumes under the bypass scenario. In this case, the difference is in degree. North of Route 66, the future downtown traffic is expected to be lower than existing conditions. South of Route 66, the future volumes should be higher than existing volumes. The bypass scenario being about 10 percent lower than the nonbypass scenario. As the influence of the truck and speed restrictions dissipate, the future volumes on Main Street increase substantially. The bypass scenario being about 8 percent lower than the nonbypass scenario. The results south of Route 66 conform to the notion that a bypass will redistribute volumes appropriately.

Major north/south transportation improvements in Joplin have been concentrated in the eastern half of the region. With this complete, the long-range transportation planning process has started to focus on the needs of western Joplin. Without a western bypass, the expected traffic growth and planned alterations to traffic patterns will result in a situation where the increases in traffic along the major eastern north/south corridors will begin to exceed the expected levels, perhaps leading to degraded service. This discontinuity represents a transportation problem that will ultimately need to be addressed.

2. Existing Roadway Designs are not Compatible with Traffic Demands

Safety is an essential measure of performance for any transportation facility. This section of the West Joplin Purpose and Need Statement will utilize crash rate data to examine the adequacy of the area's roadway designs for the volumes of traffic using them.

Currently, many of the roadways in western Joplin experience above average crash rates. Not only are the number of crashes high, but the severity of the crashes is high in comparison to statewide rates. The conclusion of the project team is that these conditions arise from roadway designs that were not intended to accommodate the increasing number and types of vehicles using them.

The discontinuity associated with the severity of crashes may be the result of the types of users in the system. While trucks are, on average, involved in crashes at a lower rate (crashes per mile) than other users, the severity of crashes involving trucks is typically much higher.

Roadway design also plays a part. The design parameters associated with roadways are geared toward the nature of the users. Interstate highways are designed with specifications (curves, slopes, medians, lane widths, and so forth) that allow them to accommodate high volumes of high speed vehicles, including a large percentage of the biggest trucks. Local roads can safely accommodate the expected number and type of users with designs adhering to less stringent (and less costly) standards. In general, the roadways in western Joplin have been designed to accommodate very low volumes.

Existing Roadway Designs are not Compatible with Traffic Demands

Currently, many of the roadways in western Joplin experience above average crash rates, apparently due to roadway designs that were not intended to accommodate the increasing number and types of vehicles using them**.** Expected future growth and planned downtown pathway redistributions are expected to exacerbate this condition.

The critical elements that define this problem are associated with:

- Some vital corridors in Joplin have above average crash rates.
- A review of existing conditions concluded that the design parameters of the roadways in western Joplin are appropriate for very low traffic volumes. As volumes increase (and new pathways develop) the existing roads will become increasingly insufficient to accommodate users.

In western Joplin, as roadways increasingly handle vehicle mixes that exceed the capacity they were designed for, higher crash rates can be expected. Additionally, the redistribution of truck traffic away from downtown will force trucks to utilize alternative pathways. This is also expected to result in a degrading of the safety environment.

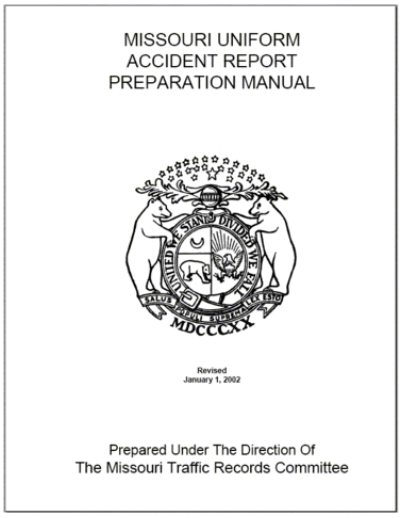
Using the traffic model developed for this project, volumes increases on the local roadways in western Joplin are predicted to be substantial. For example, without a bypass, the two-way ADT on Route JJ (at Bellecenter Road) is 3,916 vehicles per day in the base case. In 2035, that segment is expected to increase 27 percent to 4,971. The extent of the predicted increases varies across the region. While this section will concentrate on crash and roadway design topics, the expected increases in traffic volumes, with and without a western bypass, are the focus of the next section (**Section B.3.**).

a. Critical Element: Some Vital Corridors in Joplin have Above Average Crash Rates

The Missouri Uniform Accident Report Preparation Manual was last revised January 1, 2002 and is the document used by law enforcement in the event of a crash resulting in a death, a personal injury, or property damage of $500 or more. The Missouri uniform accident report is often referred to as the crash report. The crash report contains information about the people

involved in the crash, the road conditions, vehicle actions, and so forth. By knowing how the crash occurred, countermeasures can be implemented to prevent future crashes. Information available on a crash report that are typically important to review:

- Accident data and time
- Crash location
- Crash diagram
- Person information, such as the use of safety device, personal injury level, and so forth
- Type of vehicles involved
- Vehicle's sequence of events
- Contributing circumstances
- Traffic control
- Roadway information such as profile, alignment, pavement type, and so forth
- Weather condition at time of crash
- Brief narrative about events of the crash



MoDOT collects and collates this data for use in its projects. The West Joplin Purpose and Need Statement uses crash data for the 5 years between 2003 and 2007.

Introduction to the Study of Crash Rates

The standard calculation of crash rates is based on the number of crashes per hundred million vehicle miles of travel.

$$\text{Crash Rate} = \frac{(\text{Number of Crashes}) \times (100{,}000{,}000)}{(\text{Number of Years}) \times (\text{AADT}) \times (\text{Length}) \times (365 \text{ days/year})}$$

Within the Joplin study area, each roadway was evaluated as its own continuous segment. Each segment was then evaluated based on the amount of traffic it carried (AADT) and the number of crashes that occurred over that segment, during a given time period (in this case, the 5 years between 2003 and 2007).

This calculation allows a direct comparison of one roadway segment to another's crash rate, and most importantly against the state average for similar facilities. Crash rates are a good indication of the level of operation; however, it is not easy to determine if an individual crash rate is good or bad by itself. For this reason, there is a state rate available for comparison. For each type of roadway there is individual state rate. When crash rates exceed the applicable state rate, closer examination is generally needed to investigate.

Summary of Crash Rates in Joplin Area

Using the crash rate data for 2003 through 2007, the following crash rate summary was generated:

Interstate Route 44: While the 7.8 mile portion of I-44 from the Oklahoma State line to Connecticut Avenue (about 1 mile east of Route 43) experiences overall crash rates less than the Missouri state average for interstate facilities, it is notable that there are approximately 30 percent (almost twice as many) more severe crashes in the eastbound direction of travel than the westbound direction of travel.

Route 171: The 7.3 mile portion of Route 171 from Kafir Road to St. Louis Avenue experiences overall crash rates about 20 percent above Missouri state average for similar facilities. Years 2005, 2006 and 2007 have increased levels of severe accidents and overall crash rates, possibly indicating a change in the land use of the roadway.

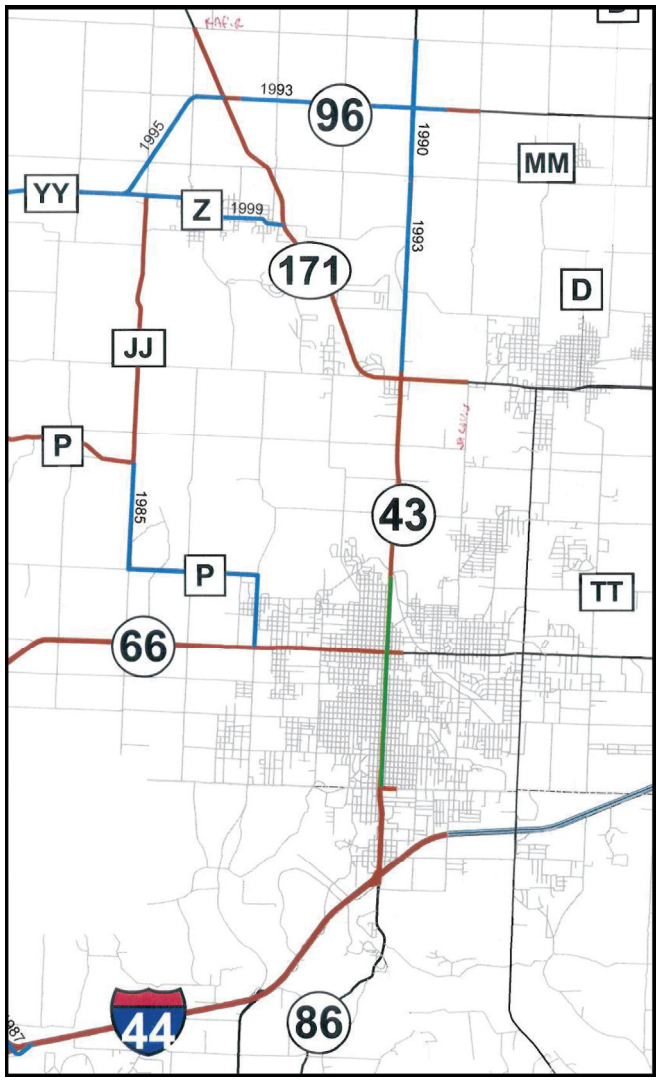
Route 96: The 3.8 mile portion of Route 96, near Carl Junction experiences overall crash rates about 100 percent above Missouri state average for similar facilities. The overall crash rates and severity remain constant throughout the study years.

Route FF: The 0.25 mile portion of MO FF (E 32nd Street) from Route 43 to Indiana Avenue experiences overall crash rates about 75 percent above Missouri state average for similar facilities. The crashes are all low severity, and overall crash rates remain constant throughout the study years.

Route 66: The 6.17 mile portion of Route 66 from the Missouri/Kansas state line to Grand Avenue, just east of MO 43 experiences overall crash rates about 80 percent above Missouri state average for similar facilities. The crashes are moderate in severity, and overall crash rates remain constant throughout the study years.

US Route166: The 0.9 mile portion of US Route 166 from the Missouri/Kansas state line to I-44 experiences overall crash rates approximately equal to the Missouri state average for similar facilities. The crashes are moderate in severity, and overall crash rates remain constant throughout the study years.

FIGURE B-2
Crash Data Key Map



Route P: The 6.6 mile portion of Route P from the Missouri/Kansas state line to Route 66 experiences overall crash rates 150 percent of the Missouri state average for similar facilities. Due to a low AADT, just a few severe crashes contribute to an extremely high severe crash rate on this roadway. Crashes have been decreasing in number during the study period.

Route 43: The 12.3 mile portion of Route 43 from Kafir Road to I-44 experiences overall crash rates 20 percent above the Missouri state average for similar facilities. Crash rates have been steady over the study period and are low to moderate in severity.

Route Z: The 2.7 mile portion of Route Z from Route JJ to Route 171 experiences overall crash rates 250 percent above the Missouri state average for similar facilities. Crash rates have declined and reduced in severity during the study period.

Route JJ: The 4.0 mile portion of Route JJ from Route Z to Route P experiences overall crash rates 70 percent above the Missouri state average for similar facilities. Crash rates are constant within the study period.

Route YY: The 4.0 mile portion of MO YY from the Missouri/Kansas State line to Route JJ experiences overall crash rates 30 percent above the Missouri state average for similar facilities. Crash rates are constant within the study period.

Overall, crash rates in the study area are fairly constant from year to year throughout the 5-year study period from 2003 to 2007. Most roadways in the study area experience crash rates significantly higher than the Missouri state average for similar facilities throughout the state.

It should be noted that the crash rate takes into account volume of the roadway, and the roadways in the study area are primarily low volume roadways. If a redistribution of traffic were to take place downtown, it is likely the volumes would increase on all of the roadways in the study area as traffic would find a different route. Given historical data throughout other areas of the state and country, an increase in volume on the existing road network will result in an increase in crashes, resulting in an increased crash rate from the current levels.



Summary of Crash Rate Analysis

The crash analysis conducted for the West Joplin Purpose and Need Statement can be summarized as follows:

- Many corridors in western Joplin have above average crash rates.
- Crash rates are fairly constant throughout the 5-year study period (2003 to 2007).
- Many of the roadways in the study area are primarily low volume roadways. Redistribution of vehicles, especially trucks, to these roadways is expected to exacerbate the crash rate situation.

Summary of Commercial Vehicle Movements

Commercial vehicles account for roughly 14 percent of the traffic movements in Joplin. The severity of the crashes found in this study may be the result of the types of users in the system. While trucks are typically involved in fewer crashes, the severity of those crashes is typically much higher. Based on a review of the 2007 O/D Study the following analysis of truck movements was developed.

Interstate Route 44 plays an important role in Joplin's roadway system, as it allows commercial vehicles to access to Joplin at several locations. The O/D study indicates that most trucks entering the Joplin area from I-44 are destined for locations in the southern portion of Joplin. The most notable destinations are the area's many medical facilities. These medical facilities are major trip generators, not only for patients and health care professionals, but also the numerous deliveries that are required daily to support these facilities. There is very little cross-town travel from the south.

Traffic that enters the study area from the east is typically close to their destination, as indicated in the O/D study. Major destinations include Missouri Southern State University and some cross-town travel to St. John's Medical Center. Traffic from the east has several options for

major arterial roadways that intersect with major north-south roadway providing systematic access throughout Joplin.

Southbound traffic entering the Joplin area from Route 171 has several choices: Route 43, Business Route 71, and Route 149. Each of these roads have high truck volumes.

Traffic entering the study area from the west is subject to the most cross-town travel of any location within the study area. Once again, one of the most notable destinations is the medical center in the southwest corner of Joplin. This traffic is primarily moving north-south, but has to make some east-west indirect travel to gain access to a major route. Trucks are more likely to use major routes and incur some additional indirect travel than to use the unimproved rural road network west of Joplin. This is likely resulting in more indirect travel for commercial vehicles, and significant indirect travel is an indication of a roadway network that is not functioning properly. The redistribution of truck traffic away from downtown will also force trucks to utilize alternative pathways. This may result addition truck traffic in southwestern Joplin. Unaddressed, truck traffic along local roadways in southwestern Joplin will increase, potentially exacerbating the crash environment.

In summary, many vital corridors in western Joplin have above average crash rates. As these roadways handle more and larger vehicles, further degradation of the safety environment can be expected. This issue represents a transportation problem that will ultimately need to be addressed.

b. Critical Element: Existing Roadway Designs are not Compatible with Traffic Demands

The roadways in western Joplin are, by and large, rural roadways. AASHTO categorizes rural roadways into four major categories:

- Rural Principal Arterial: Roadways designed for trip length and density suitable for statewide or interstate travel.
- Rural Minor Arterial: Roadways that provide linkage to larger towns and are suitable for both interstate and inter-county service. These routes should be expected to provide relatively high travel speeds and minimum interference to through movement.
- Rural Collector: Roadways intended for inter-county travel with shorter travel distances. Moderate speeds are typical, as collector roads are meant to accumulate traffic from local roads.
- Rural Local Road: Roadways which provide access to land adjacent to the collector roadway network and serves travel over short distances. This classification covers all roadways not included in the previous classifications.



Many roads in western Joplin have no shoulders.

The most notable east-west roadway west of Route 43 is Route 66. This roadway is primarily a four-lane divided highway of moderate volume. Given the AASHTO defined classifications above, Route 66 is most similar to a major collector roadway.

The most notable north-south roadway west of Route 43 is Route JJ. This roadway would be classified as a minor collector roadway according to AASHTO. This roadway has 10-foot asphalt driving lanes, with gravel shoulders. The setbacks on this corridor are more generous than the surrounding local roads.

Most of the other roadways in the area would be classified as a rural local road. These roads are asphalt driving surface, with narrow, approximately 10-foot lanes. Most have no paved or even gravel shoulders, as many are directly adjacent to a ditch and a dirt bank, leaving virtually no clear zone for safety.



The topography of western Joplin varies considerably, making horizontal and vertical sight distances an issue.

Speed limits vary considerably on these roadways from 35 mph to 55 mph. Stops signs are frequent, and driver expectations are challenged, as some intersection stops are two-way, while others are four-way. Several intersections are offset, where a driver must make a slight jog while crossing a more major roadway. In a few locations, the major traveled way experiences a sharp curve with a major speed reduction. Drivers unfamiliar with the area could easily become confused with the unusual conditions, resulting in a network that does not provide a feasible through route.

The topography of western Joplin varies considerably. While some areas are relatively flat, with some gentle rolling terrain. Others have more drastic geographic changes. Stream crossings indicate floodplain issues. Horizontal and vertical sight distance is an issue on most of the roadways, specifically the local roadways towards the southern portion of the study area where vertical and horizontal alignment becomes variable.

Land use along the roadways is primarily rural. Homes and buildings are often built close to the roadway due to the terrain. The northern sections of the study area have more generous set-backs, as allowed by the terrain.



Driver control systems (speed limits, stop signs, etc) are widespread and inconsistent, making driver confusion an issue.

As discussed previously, the roadways in western Joplin experience high crash rates, relative to state averages for comparable roadways. Increases in traffic will exacerbate this situation. The local roadways were not meant to carry high traffic volumes, through traffic, or commercial vehicles. The collector routes have been designed to carry higher volumes, but for the most part, lack continuity. Maintenance issues will increase as volumes and truck percentages increase. The consequences of increases in volumes and redistributed truck traffic are expected to be increased travel times and difficult driving conditions. As part of this project, preliminary consideration of design standards was undertaken. Using the guidance for practical design, initial design criteria were outlined. These are contained in **Appendix C**. Adherence to these criteria should allow for the new or reconstructed roadways to operate in a manner consistent with the traffic conditions expected for the future.

In summary, the roadway system in western Joplin is primary composed of roadways that were designed for low volumes of traffic. As these roadways handle more and larger vehicles, operational degradation can be expected. This issue represents a transportation problem that will ultimately need to be addressed.

Existing Roadway Designs are not Compatible with Traffic Demands

The condition of existing roadways in western Joplin varies widely. Among the identified problems include:

- Driver control systems (speed limits, stop signs, and so forth) are widespread and inconsistent, making driver confusion an issue.
- The topography of western Joplin is diverse, making horizontal and vertical sight distances an issue.
- Many of the roadways in the area have narrow driving surfaces, narrow paved or gravel shoulders, and roadside bank/ditch configurations, making the lack of clear zones for safety an issue.

3. Community and Economic Development is Affected by Mobility Deficiencies

Substantial growth is expected for western Joplin. In anticipation of this growth, most infrastructure systems have been improved. The adequacy of the roadway is the subject of this study.

The need for a fourth major north/south corridor is widely expected. Failure to address the access discontinuities expected by the growth of Joplin will negatively affect community and economic development.

Using the travel demand model created for this project, the West Joplin Bypass envisioned by the LRTP was coded. This allowed for comparisons, solely for the purposes of evaluating how community and economic development will be affected by failing to address the mobility needs of the area. The bypass coded into the travel demand model does not indicate that this is the only way to achieve the economic/community development goals of Joplin. The development and evaluation of alternatives is beyond the scope of this project.



Transportation Problem: Community and Economic Development is Affected by Mobility Deficiencies

Unaddressed, the access discontinuities expected by the planned growth of Joplin will create circumstances that will negatively affect community and economic development.

The critical elements that define this problem are associated with:

- There is a potential for negative community development consequences from not providing the fourth north/south corridor widely expected in the community's long-term planning.
- There is a potential for negative economic development consequences from failing to accommodate the large economic generators being developed in western Joplin.
- I-44 is vital to the mobility needs of Joplin. Many of the Joplin interchanges have safety, operation, and geometric issues. There is a potential for negative consequences from inefficiently utilizing the interchanges to I-44.

Supporting materials associated with the travel demand model created for this project are contained in **Appendix D**.

The projected traffic volumes for the three conditions evaluated (existing, future conditions without a new alignment bypass and a future projection with a new alignment bypass) are contained in **Appendix A** as **Exhibits A-6, A-7** and **A-8**.

Based on this evaluation, the following community/economic development issues (critical elements) were identified:

a. Critical Element: The consequences of not providing the fourth north/south corridor widely expected in the community's long-term planning

As discussed previously, regional planning efforts specify a desire for substantial growth in western Joplin. To facilitate this growth, the need for a fourth major north/south corridor is widely expected. In fact, the LRTP includes a new alignment western bypass as a future project (LRTP project 101). **Figure A-3** provides the complete list of programmed and future projects from the LRTP.

Using the travel demand model created for this project, it is possible to examine and identify constituent facts that tend to support the validity of the region's planning goals. A powerful tool to do this is the comparison of future conditions with and without a typical/default bypass. This section will examine two such constituent facts: *Total daily system capacity* and *rerouting of north/south movements on internal streets.*

Total Daily System Capacity

One way to examine a transportation system is through the total system usage. Daily capacity can be calculated in two ways; by daily vehicle miles of travel (VMT), or by capacity miles in the system. Both measures were calculated for each of the three alternatives. This can be thought of as the total daily system capacity:

- Base Case - 2,016,050 daily vehicle miles of travel, or 4,509,600 capacity miles
- 2035 without a bypass - 2,431,100 daily vehicle miles of travel, or 4,798,600 capacity miles
- 2035 with a bypass - 2,433,900 daily vehicle miles of travel, or 5,507,750 capacity miles

The impact of the bypass is represented by the difference in the 2035 projections. In this case an additional 2,806 miles of travel per day, as well as a significant increase in capacity miles available, is predicted. This correlates well with the ADTs predicted for a typical/default bypass. North of Route 66, the two-way ADT falls from a high of 6,369 (at Route 66) to a low of 2,458 (at the northern termini). South of Route 66, the predicted 2035 ADT is 10,104.

It is often difficult to put macroscopic metrics, like the total daily system capacity, into perspective for decision-making. In this case, the macroscopic metrics tend to support the regional planning goal of increased development in western Joplin, but is the increase significant or worth the expense? Can other solutions provide better or cheaper results? These are questions that are more appropriately addressed later in the NEPA process.

Rerouting of North/South Movements on Internal Streets

A metric that avoids some of the limitations of a macroscopic view, is the comparison of specific movements, with and without a typical/default bypass. In **Section B.1.a and b** the consequences of the planned conversion of Main Street to a more pedestrian friendly roadway is discussed. Speed reductions and truck restrictions on Main Street will force through traffic to take another north/south corridor. This creates a situation (a discontinuity) where traffic bound for a destination to the west of Joplin will be forced to take a circuitous route. It also creates a situation where truck traffic on local roads is expected to grow substantially. These local roads are largely recognized as neighborhood streets where the quality-of-life would be negatively impacted by increases in truck traffic. When a typical/default bypass is evaluated, substantial traffic reductions along some minor north/south corridors is evident.

Representative examples of the traffic reductions (two-way ADT) associated with a typical/default bypass are shown below:

TABLE B-5
Examples of Two-Way ADT Traffic Reductions Associated with Typical/Default Bypass

	Without bypass	With bypass	Reduction
Route JJ			
at Route 171	2,558	2,242	12 percent
Bellecenter Road	4,971	2,717	45 percent
Black Cat Road			
at Route 171	2,541	1,886	26 percent
at Bellecenter Road	962	459	52 percent

It is important to note that not all of the north/south corridors discussed in **Section B.1.b** will experience traffic reductions. The bypass seems to have no impact on Jackson Avenue/Lone Elm Road or Schifferdecker Avenue. This is probably the result of local delivery trips that must use these roads for access to Main Street.

b. Critical Element: The consequences of failing to accommodate the large economic generators being developed in western Joplin

Economic development can be unnecessarily constrained by inadequate capacity. Modeling indicates that a western bypass will draw both new traffic and relieve other north/south corridors. The increase in total daily system capacity with a typical/default bypass (**Section B.3.a**) is one way to quantify the concept of economic development.





The Downstream Casino Resort is located at the intersection of Missouri, Kansas, and Oklahoma. It is expected to draw 2 million visitors per year.

This section will use the travel demand model and focus on future conditions with and without a typical/default bypass. Two ideas related to a new north/south corridor and economic development will be examined:
1) *Northern pathways to the southwestern Joplin*
2) *Changes in Route 66 traffic*

Northern Pathways to the Southwestern Joplin

Development in the southwestern portion of Joplin is expected to increase the volumes of traffic coming from Joplin toward this area. An important element driving this is the recently completed Downstream Casino Resort.

The Downstream Casino Resort is a $301 million Las Vegas-style destination resort. The casino opened in July 2008 with Phase I completed in November 2008. The resort is owned and operated by the Quapaw Tribe. Downstream's main entrance and golf courses are in Missouri; its parking lot is in Kansas, and its buildings are in Oklahoma. The Phase I amenities include a 70,000 square foot casino, seven restaurants, 237 hotel rooms, a conference center and two 18-hole golf courses. The operators expect the resort to employ 1,200 people and host 2 million visitors per year.



The Downstream Casino Resort is not the only generator expected to be in place in the near-term. Construction at the Wildwood Ranch has begun.

The Downstream Casino Resort is not the only generator expected to be in place in southwestern Joplin. Near term developments include projects like the Wildwood Ranch, a planned unit development- type project. The low-density residential component has begun. Commercial, office, manufacturing, warehouses, hotels, and apartments are planned. Joplin is also a hub for the warehouse and freight industries. Expansion into southwestern Joplin is desired and expected. In 2008, *Expansion Solutions* magazine recognized Joplin as a top five pick in the Warehousing/Distribution sector. They cited Joplin's highway and rail transportation assets as a top feature in the selection, as well as Joplin's workforce. In addition, there are numerous large freight companies located in the area that provide logistics services. Several of the region's freight and industrial parks are shown on **Exhibit A-3**. The development of southwest Joplin is a regional goal. The Joplin Comprehensive Plan identifies "Opportunity Areas" – areas where the creation of quality development is possible and to be encouraged. There are also commercial and industrial opportunity areas in Southwestern Joplin.

Summary of 2035 Volumes Adjacent to the Downstream Casino

Two-Way ADT without a default bypass:

- Entering Casino: 11,525
- Immediately North: 8,241
- Immediately South: 22,160

Two-Way ADT with a default bypass

- Entering Casino: 12,050
- Immediately North: 13,143
- Immediately South: 19,318

Exhibit A-3 best depicts the location of the Downstream Casino and the Wildwood Ranch. The primary northern pathways to the area are US Route 166 and Route 26.

US Route 166/US Route 400 is a two-lane highway with 12-foot lanes and 10-foot gravel shoulders in Missouri and 10-foot paved shoulders in Kansas. The posted speed limit is 55 miles per hour. Near the casino, US Route 166/US Route 400 are coincident. They diverge in Kansas. US Route 166 extends to the west toward Baxter Springs and Chetopa. US Route 400 extends north toward Pittsburg and Fort Scott.



A main intersection in Galena Kansas is Route 66 and Route 26.

Kansas Route 26 is a two-lane highway with 12-foot lanes and 10-foot paved shoulders. The posted speed limit is 55 miles per hour. Route 26 extends northward to Route 66 in Galena, Kansas

The base case (existing) utilized in the project's travel demand modeling assumes that the Downstream Casino is not yet open. The future condition projections are for 2035. The projected 2035 two-way ADT at the casino's US Route 166 entrance, without a western Joplin bypass, is 11,525 vehicles. With a western Joplin bypass the projected two-way ADT at the casino entrance is about 5 percent higher (12,050). While the volumes going specifically to the casino are relatively unaffected by a typical/default bypass the routes that they take are different, depending on the availability of a bypass.

In either case, fewer vehicles would utilize the northern pathways to southwestern Joplin and the casino, than would utilize the southern pathways (via I-44). With a bypass, northern pathways become more attractive. Higher use of the northern pathways can be considered beneficial not only for the economic development that it represents to Joplin, but also for the moderation of flows that would otherwise utilize the I-44 interchanges. The southern pathways will be discussed further in **Section B.3.c**.

The northern pathways to southwestern Joplin are summarized in **Table B-6**.

TABLE B-6

Two-Way ADTs on Northern Pathways to Southwestern Joplin

Pathway	Base Case ADT	2035 ADT without Bypass	2035 ADT with Bypass
US Route 166/US Route 400	2,410	2,944	2,944
Route 26	2,406	6,876	1,552
Typical/Default Bypass	n/a	n/a	10,104
Total	**4,816**	**9,820**	**14,600**

Based on these results, the following conclusions were drawn:

- The number of vehicles coming to southwestern Joplin from the north, to the vicinity of the casino, is highest with a typical/default bypass. The bypass will handle the vast majority of this traffic. The highest 2035 two-way ADT on the bypass is predicted to be 10,104. The predicted volumes on the existing local roadways, with a bypass, will be close to the levels currently experienced.
- Without a bypass, traffic on the existing (local) roadways would more than double (9,820 is a 117 percent increase over the base case's 4,523). The extent of the increases on the local roadways (without a bypass) varies by location. In general, the extent of the increases falls to the north, particularly north of Route 66.

- Without a bypass, the traffic increases would be most pronounced on Route 26. The predicted 2035 volumes would roughly triple – from 2,113 to 6,876. The bypass' impact further west into Kansas is minimal. For example, the volumes on US Route 166/US Route 400 (at its intersection with Route 26) are roughly the same, with or without a bypass.

Existing developments like the Downstream Casino Resort and the Wildwood Ranch represent the foundations for the economic development expected for southwestern Joplin. Based on the predicted increases in traffic volumes, infrastructure improvements (in Missouri) can be expected to yield the types of benefits imagined in the region's planning. Without improved pathways in Missouri, the economic development associated with large scale generators, such as the casino, will accrue elsewhere.

Changes in Route 66 Traffic

The casino is undeniably a considerable draw. But beyond strictly casino traffic, does the travel demand model indicate whether Joplin-specific economic development will occur? To answer that question, an examination of east/west traffic was undertaken. If after accounting for casino trips, the total vehicle trips under a bypass scenario increases, economic development can reasonably be assumed. The analysis focused on the primary east/west corridor in Joplin (Route 66).

Table B-7 summarizes the two-way ADT's on Route 66 in western Joplin.

TABLE B-7

Two-Way ADTs on/at Route 66

Pathway	Base Case ADT	2035 ADT without Bypass	2035 ADT with Bypass
Route 66 - West of Route 26	10,420	11,548	11,548
Route 66 - West of Bypass Intersection	8,998	15,421	10,861
Route 66 - East of Bypass Intersection	8,998	15,421	19,426
Route 26 at Route 66	3,771	7,610	3,147
Important Results:			
• With a bypass, 8,565 vehicles per day leave Route 66 at the intersection with the bypass.			
- East of the bypass, the bypass scenario results in 4,005 **more** vehicles per day on Route 66.			
- West of the bypass, the bypass scenario results in 4,560 **fewer** vehicles per day on Route 66.			
• West of Route 26, Route 66 traffic is relatively constant in both the base case and the future cases			

Without a bypass, Route 26 in Kansas will be a convenient route for some Joplin-based casino traffic. With a typical/default bypass, it is assumed that all of the Route 26 casino traffic will utilize the bypass. Consequently, Joplin-based casino traffic can be estimated as the differences in the traffic levels on Route 26 (7,610 – 3,147). This estimates the number of casino trips coming through Joplin on Route 66 as 4,463. This correlates well with other estimates, such as the bypass scenario having 4,005 more trips than the nonbypass scenario, east of the bypass intersection. The fact that the Route 26 volumes balance, further supports this estimate (that is,

with a bypass, the 2035 Route 26 volumes are roughly equivalent to the base case – 3,771 versus 3,147).

The bypass increases the Route 66 volumes on the western edge of Joplin by 8,565. Assuming that 4,463 trips are casino related, that means that 4,102 trips are for other purposes. By these measures, roughly 50 percent of the bypass-related trips on Route 66 are on noncasino purposes. These trips can be seen as the type of trips essential for the economic development proposed by Joplin.

The nonbypass scenario would have all Joplin-based trips to the casino area utilize Route 26, in Kansas. Even if it were impossible to quantify that noncasino trips existed, the fact that all of these trips are closer to Joplin demonstrates the economic development potential of a bypass.



Will a Western Bypass Generate Noncasino Trips to Southwest Joplin?

- Joplin-based casino trips - 4,463 per day
- Bypass increases Route 66 traffic by 8,565

By these measures, roughly 50 percent of the bypass-related trips on Route 66 are on noncasino purposes.

In summary, large generators such as the Downstream Casino Resort[3] are expected to constitute the foundation for the economic development planned for southwestern Joplin. Economic development can be unnecessarily constrained by inadequate capacity. Modeling indicates that without an appropriate north/south corridor, that traffic to southwestern Joplin will utilize non-Missouri corridors, such as Route 26, to access the area. Further, without an appropriate north/south corridor any economic development trips drawn to the larger generators in southwest Joplin, will accrue to the available pathways. This discontinuity represents a transportation problem that will ultimately need to be addressed.

c. Critical Element: The consequences of inefficiently utilizing the interchanges to I-44

I-44 is vital to the mobility needs of Joplin, and a large number of the trips entering southwestern Joplin will do so via I-44. Many of the Joplin interchanges have safety, operation, and geometric deficiencies. Any regional transportation project may positively or negatively impact I-44. The consequences of inefficiently utilizing the interchanges to Interstate Route 44 can be expected to negatively affect community and economic development. This section will 1) summarize the some of the difficulties facing the interchanges on I-44, 2) summarize the nature of the traffic patterns to southwestern Joplin, and 3) use the travel demand model to document the potential impact on I-44, with and without a typical/default bypass.

[3] The Downstream Casino Resort is not the only generator expected to be in place in the near-term. Others, such as the Wildwood Ranch, propose residential, commercial, and industrial uses. While the text may focus on the casino, the future traffic demands in western Joplin should be considered more broadly.

Summary of Issues Affecting I-44 Interchanges

There are several I-44 interchanges within the Joplin area. Exit 1 is at the Missouri/Oklahoma border. US Route 166 begins/ends at the I-44 interchange. There are no southbound movements at this interchange. Exit 4 is a modified diamond interchange at Route 43 (southbound). Schifferdecker Avenue/Coyote Drive is the northbound connection into Joplin. Exit 6 is a diamond interchange at Route 43/Main Street. Exit 8 is a cloverleaf interchange at Business Route 71. Exit 11 is a Parclo semidirectional interchange at US Route 71 (south)/Route 249 (north). Exit 15 is a split diamond at Route 66. Exit 18 is a cloverleaf interchange at US Route 71 (north).



Differences in Volumes on I-44

The volumes predicted for I-44 vary between the I-44 Purpose and Need Statement and the West Joplin Purpose and Need Statement. This is primarily due to the methodology used to "grow" trips into the future.

Because of its detail and the availability of origin/destination information, the travel demand model used in the West Joplin Purpose and Need Statement is expected to be more representative of true travel patterns.

The I-44 Purpose and Need Statement did not include the Downstream Casino Resort in its traffic projections and did not have access to the Joplin O/D Survey.

Many of the Joplin interchanges have safety, operation, and geometric issues. This is one of the transportation problems that emerged from the I-44 Purpose and Need Statement.

Relative to *safety*, a total crash rate analysis, a fatal crash rate analysis, and a crash location severity analysis were conducted on the 78 interchanges along I-44. For each analysis, criteria were established to identify interchanges that have particularly problematic safety performance. The analysis found that many of the interchanges exceeded one or more of these criteria. Of the 78 interchanges, 17 (22 percent) exceeded the established total crash rate criteria and 50 percent (39 interchanges) exceeded the established fatal crash rate criteria. Approximately 37 percent (29 interchanges) had crash hotspots. Only eight interchanges were found to exceed the crash-related criteria for all three criteria. This included several of the Joplin interchanges (Exit 6, Exit 8, and Exit 11).

Relative to *operations*, a level of service (LOS) analysis was used to determine if a given facility will be able to adequately handle future traffic volumes. The analysis focused on weaving movements, ramp merge movements, and ramp diverge movements. In the base year (existing), most of the existing interchanges operated well, with only four ramps and two weaving segments operating at LOS worse than the recommended thresholds. One of these locations was the eastbound weave at the US 71 North/Route 59 South cloverleaf (Exit 18). In the future (2035), numerous merge, diverge, and weaving movements were found to operate a levels worse than the recommended thresholds. Exits 6, 8, and 18 had multiple problematic movements.

Relative to *geometrics*, the I-44 interchanges were evaluated against seven key design features (two relating to access management and five relating to horizontal and vertical geometry). Many interchanges have at least one geometric design deficiency. This is generally the result of evolving standards. The highest number of deficiencies encountered was four. Along the entire

250-mile section of I-44 only two interchanges had four design feature deficiencies. Exit 4 is one of them.

Summary of I-44 Traffic Patterns to Southwestern Joplin

Current traffic coming from I-44 is relatively low. The base case (existing) utilized in the project's travel demand modeling assumes that the casino is not yet open. The existing two-way ADT in the vicinity of the casino (on US Route 166) was projected to be 3,603.

Development in southwestern Joplin is expected to increase the volumes of traffic coming from I-44 toward this area. This has the potential to negatively impact I-44 and its interchanges. While the recently completed Downstream Casino Resort is perhaps the most easily identifiable large generator, there are other projects that will also increasingly affect the traffic environment of southwestern Joplin.



Summary of 2035 Volumes to Downstream Casino

- Two-Way ADT without a typical/default bypass: 11,525
- Two-Way ADT with a typical/default bypass: 12,050

A largest number of the trips entering southwestern Joplin will do so via I-44. The Exit 1 interchange at I-44 is less than 1 mile away from the casino. The casino operators expect the resort to employ 1,200 people and host 2 million visitors per year. This proximity will generate a large number of trips. The other major pathway is from the north. Currently, the best northern pathway is from Route 66 to Route 26 to US Route 166. These northern movements are examined in **Chapter B.3.b**.

According to the traffic model, the number of trips entering the casino is relatively unaffected by a default/typical bypass. The projected two-way 2035 ADT from the casino's entrance, without a bypass, is 11,525. With a bypass the projected 2035 ADT at the casino entrance is about five percent higher (12,050).

The base case (existing) utilized in the project's travel demand modeling assumes that the casino was not yet open.

On the other hand, the traffic volumes from I-44, in the general vicinity of southwestern Joplin (on US Route 166), are affected to a much larger degree by a bypass. The consequences of this represent a transportation problem that will ultimately need to be addressed.

Bypass-Related Impacts to I-44

Traffic volumes on US Route 166 (from I-44) are expected to increase roughly 500 percent between the base case and 2035 (see **Table B-8**).

TABLE B-8

Two-Way ADTs on US Route 166 Immediately North of I-44

Base Case (Existing) ADT	2035 ADT without Bypass	2035 ADT with Bypass
3,603	22,160	19,318

The travel demand model also predicts that 15 percent more vehicles (2,842 per day) will use I-44 to access the Downstream Casino area, if a new alignment bypass is unavailable. This demonstrates the positive affect that a regional project can have on Joplin and I-44. Not only do the rerouted vehicles provide relief (reducing the number of vehicles getting on and off I-44) for the Exit 1 interchange, but it also provides relief for the other Joplin interchanges.

Broadly speaking, the vehicles destined for southwest Joplin (the casino), that would abandon I-44 for a typical/default bypass would otherwise use the Joplin I-44 interchanges that have documented safety, operation, and geometric issues. This alteration reduces volumes and should improve the interchange's functionality. This will provide local, regional, and statewide benefits. Local travelers will have more direct pathways to their intended destinations, region congestion will be kept at the lowest possible levels, and statewide planners will have the benefit of extra time before needing to implement I-44 interchange solutions.



I-44 is Vital to the Mobility Needs of Joplin

Many of the Joplin I-44 interchanges have safety, operation, and geometric issues. The consequences of inefficiently utilizing the interchanges to I-44 can be expected to negatively affect community and economic development.

Development in the southwestern portion of the study area (such as the Downstream Resort Casino) is expected to increase the volumes of traffic coming from Joplin toward this area, negatively impacting the I-44 interchanges.

Any regional transportation project may positively or negatively impact I-44. For example, a western bypass will divert substantial amounts of traffic (15 percent), which would otherwise use I-44, to access the southeast portion of the study area.

The interchanges that seemingly benefit the most from the travel pattern alterations associated with a typical/default bypass are the interchanges at Exit 4 (Route 43 - southbound), Exit 6 (Main Street), and Exit 8 (Business Route 71). The others appear relatively unaffected.

Table B-9 provides a summary of two-way ADTs on I-44.

TABLE B-9

Two-Way ADTs on I-44 Between the Joplin Interchanges

Between Interchanges	Base Case	2035 without Bypass	2035 with Bypass	Difference (Percent Difference)
1 and 4	31,136	49,283	45,916	3,367 (-6.8%)
4 and 6	40,784	56,386	53,138	3,248 (-5.8%)
6 and 8	44,262	50,526	50,811	285 (0.56%)
8 and 11	38,494	41,425	40,020	1,405 (-3.4%)

Several thousand fewer vehicles will use the I-44 interchanges with a typical/default bypass. Apparently, these individuals would have taken one of Joplin's major north/south corridors to I-44 and from there, gone to the southwestern Joplin area. Removing these vehicles will benefit interchange operation, as well as the respective north/south corridors.

In summary, I-44 is essential to the nation, Missouri and Joplin. Large generators in southwestern Joplin, such as the Downstream Casino Resort, have the potential to substantially increase traffic volumes on I-44 and its interchanges and could result in negative impacts. Modeling indicates that an appropriate north/south corridor could substantially reduce the volume of traffic accessing southwestern Joplin via I-44. The potential impacts that regional activities can have on the operation of I-44 represent a transportation problem that will ultimately need to be addressed.

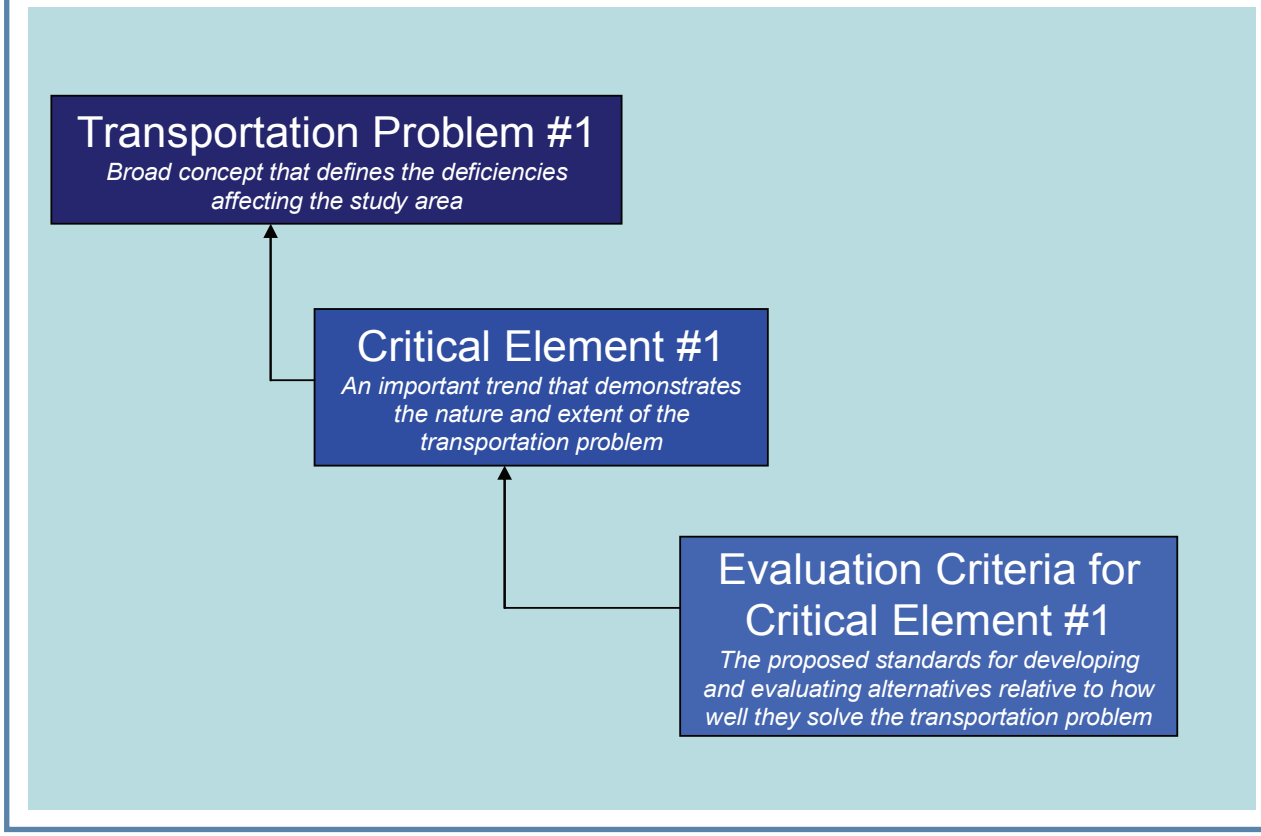
Section C: Evaluation Criteria

Section B of the West Joplin Purpose and Need Statement examines the nature and scope of the transportation-related problems that affect western Joplin. This was accomplished by the identification of ***Transportation Problems*** and the examination of the ***Critical Elements*** that underlie these problems.

This section will propose evaluation criteria for this project. ***Evaluation Criteria*** are measurements that define how well an alternative succeeds at addressing the critical elements. Using a step-wise process of this type will assist in identifying those alternatives that can satisfy a project's purpose and need[1].



The Relationship between Transportation Problems, Critical Elements, and Evaluation Criteria



This section will present the proposed evaluation criteria for each of the critical elements identified. They will be organized under their associated transportation problems.

[1] Projects that cannot generate build alternatives that minimally satisfy the purpose and need, logically lead to a no-build decision.

1. Transportation Problem 1: Proposed Access Goals for Main Street Create Discontinuities

Planning in Joplin envisions a community where current access patterns better support community goals. For example, the region's major planning documents are focused on providing a more vibrant, more pedestrian-friendly downtown. To achieve these goals, vehicular traffic will be constrained. This will create discontinuities that represent a transportation problem that will ultimately need to be addressed.



The Relationship between Transportation Problems, Critical Elements, and Evaluation Criteria

A common *Transportation Problem* is to improve safety/reduce crashes on road "XYZ."

One of the underlying causes of the safety problems on road "XYZ" might be crashes caused by poor geometrics in identifiable hotspots. In this case a *Critical Element* of the transportation problem might be the need to address specific (crash causing) roadway deficiencies on road "XYZ."

Evaluation Criteria are the mechanisms to help develop solutions and determine success. For instance, how well do the alternatives comply with the project's design guidelines? If not all design guidelines are equally important, the evaluation criteria can reflect that.

Table B-1 is organized to summarize all of the transportation problems, critical elements, and proposed evaluation criteria discussed in this document.

The critical elements that define this problem are:

- Speed reductions and truck restrictions on Main Street will force through traffic to take another longer north/south corridor (Critical Element 1).
- Speed reductions and truck restrictions on Main Street will increase the percentage of trucks in the traffic stream on local roadways (Critical Element 2).
- Projected future traffic is expected to create an unbalanced eastward development bias that will degrade existing north/south corridors (Critical Element 3).

a. Evaluation Criteria for Critical Element 1

Speed reductions and truck restrictions on Main Street will force through traffic to take another north/south corridor. The qualitative and quantitative examination of this detour effect focused on the 2007 Regional O/D Survey. It showed that if the planned speed reductions and truck restrictions are effective, through traffic destined for western locations would be forced to take a circuitous route. For example, vehicles coming into the Joplin area from the northwest, destined for points west on I-44 or Route 66, would take another (longer) north/south corridor. This detour could result in hundreds of thousands of miles of extra travel and possibly thousands of hours of lost productivity. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent do alternatives minimize the detour impacts of restrictions on Main Street?

This can be characterized in several ways[2]. For instance, the traffic model could be used to compare the composition of traffic on Main Street and the other major north/south corridors. Those solutions that best minimized detour traffic would be superior. No-build type solutions could also be examined through the consequences of modifying the nature/extent of the model's speed reductions/truck restrictions on Main Street. Another way to characterize how well a solution might address detour impacts could be through driver questionnaires, perhaps in conjunction with a future update of the O/D Survey. Alternately, informal queries with business interests, such as the Chamber of Commerce or the Missouri Motor Carriers Association, could help qualify how effective potential solutions might be. This type of query could by done in numerous ways. At a minimum, these types of stakeholders will be important to include in any future public involvement plans.

b. Evaluation Criteria for Critical Element 2

Speed reductions and truck restrictions on Main Street will increase the percentage of trucks in the traffic stream, on local roadways. The qualitative and quantitative examination of this critical element demonstrated that if the planned speed reductions and truck restrictions are effective, an unintended consequence would be an increase in truck traffic on local roadways. Distinct from the detour impacts, the O/D survey showed that many of the large truck trip producers are in the immediate vicinity of Main Street and that many of their trips are for local purposes. To quantify this, a comparison was conducted using a typical/default new alignment western bypass in the traffic model. The result was substantial increases in truck traffic on some adjacent local roadways – under the no-bypass future condition. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent do alternatives adequately remove truck traffic from local routes?

This can be characterized in ways similar to those for Critical Element 1. For instance, quantitative measures could focus on the consequences revealed in the traffic model as they relate to truck traffic. It might be feasible to utilize a metric representing a maximum desired truck percentage that should not be exceeded. For example, it might be reasonable to view solutions that do not maintain the existing percentage of trucks on local streets as incapable of satisfying this critical element. Input from stakeholders could also be effective at developing useable qualitative measures for evaluating solutions. In this case, qualitative measures could be developed by discussing the needs of local trucking operators and the concerns of the various affected neighborhoods. This could develop effective measures by which alternatives could be fairly judged.



Are the Transportation Problems Equally Important?

Not necessarily, as with most problems, their severity is dependent on one's perspective.

The ordering of problems, critical elements and evaluation criteria in this document is not intended to represent their relative importance.

The intent of this document is to provide enough data to establish the extent of the transportation problems affecting western Joplin. It is more appropriate to do any ranking of the problems during the alternative development/evaluation stages of the project.

[2] As with all of the evaluation criteria discussions, these are recommendations based on the analysis conducted during the purpose and need statement. Future developments may affect the actual criteria used to development and evaluate potential solutions.

c. Evaluation Criteria for Critical Element 3

Projected future traffic growth is expected to create an unbalanced eastward development bias that will degrade existing north/south corridors. The critical element examination focused on the scale of future volumes on the existing north/south corridors. Without an appropriate western north/south corridor, the growth in project future traffic is expected to degrade the existing north/south corridors. Additionally, as restrictions increase on Main Street, the growth of eastern Joplin will increase resulting in proportionately higher congestion levels on other north/south corridors. For example, in 2035 two-way ADT on some segments of Business Route 71 will exceed 33,530 vehicles per day without a western bypass. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent do alternatives provide for sustainable growth on existing north/south corridors through Joplin?

Characterizing this critical element should focus on the notion of sustainable growth. This is a qualitative and local issue. Consequently, the recommended measure should relate the local planning environment with the evolving field of sustainable development. For instance, how well do solutions conform with the region's current sustainable growth priorities? The concepts typically associated with sustainability permeate the city's planning, particularly the comprehensive plan and the downtown revitalization plan. It is expected that Joplin will continue to define their goals in regards to sustainable development. These goals should form the basis of the evaluation criteria for this critical element.

2. Transportation Problem 2: Existing Roadway Configurations are not Compatible with Traffic Demands

Currently, many of the roadways in western Joplin experience above average crash rates, apparently due to roadway configurations that were not meant to handle the increasing number and types of vehicles using them. Expected future growth and planned downtown traffic restrictions are expected to exacerbate this condition.

The critical elements that define this problem are:

- Some vital corridors in Joplin have above average crash rates (Critical Element 1).
- Existing roadway design parameters are inadequate for increased traffic volumes (Critical Element 2).

a. Evaluation Criteria for Critical Element 1

Some vital corridors in Joplin have above average crash rates. The examination of this critical element focused on a crash rate analysis that concluded: 1) some vital corridors in Joplin have above average crash rates; 2) crash rates are fairly constant throughout the 5-year study period (2003 to 2007), and 3) many of the examined roadways are very low volume roadways. Redistribution of vehicles, especially trucks, to these roadways is expected to exacerbate the crash rate situation. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent do alternatives address known traffic hotspots?

Characterizing this critical element should focus on using current traffic engineering policy to establish appropriate measures for identifying areas of crash hot spots (concentrated crash locations). For instance, the I-44 Purpose and Need Statement used a methodology that defined crash hotspots as anywhere there were three or more disabling injury or fatality crashes within any 0.3-mile segment of roadway. Alternatives could address a crash hotspot in several ways. One way to address a crash hotspot is to reconstruct the roadway to eliminate potential deficiencies. Another way is to lower the speeds or traffic volumes using the roadway. The adequacy of any particular way of addressing a crash hotspot will be assessed during the development of potential solutions.

b. Evaluation Criteria for Critical Element 2

Existing roadway configurations may be inadequate for increased traffic volumes. The examination of this critical element focused on the existing design parameters in western Joplin. The evaluation of existing conditions concluded that 1) driver control systems (speed limits, stop signs, and so forth) vary widely and are sometimes inconsistent; making driver confusion an issue; 2) the topography of western Joplin is diverse; making horizontal and vertical sight distances an issue, and 3) many of the roadways in the area have narrow driving surfaces, narrow, paved, or gravel shoulders and roadside bank/ditch configurations; making the lack of clear zones a safety issue. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: Are the roadway configurations adequate to accommodate predicted traffic (especially in regards to truck traffic)?

Characterizing this critical element should focus on how well alternatives conform with design guidelines. **Appendix C** contains preliminary design guidelines that were determined to be potentially appropriate for this project.

3. Transportation Problem 3: Community and Economic Development is Affected by Mobility Deficiencies

Unaddressed, the expected access discontinuities and traffic growth within western Joplin will create circumstances that will negatively affect community and economic development. The critical elements that define this problem are:

- There is a potential for negative community development consequences from not providing the fourth north/south corridor widely expected in the community's long-term planning. Specifically, inappropriate traffic on local roadways will increase (Critical Element 1).
- There is a potential for negative economic development consequences from failing to accommodate the large economic generators being developed in western Joplin. Specifically, inadequate capacity will constrain economic development (Critical Element 2).
- I-44 is vital to the mobility needs of Joplin. Many of the Joplin interchanges have safety, operation, and geometric issues. Without a western north/south corridor, traffic utilizing these interchanges will increase. Consequently, there is a potential for negative consequences from inefficiently utilizing the I-44 interchanges (Critical Element 3).

a. Evaluation Criteria for Critical Element 1

Negative community development consequences are expected from not providing a fourth north/south corridor. Regional planning efforts specify a desire for substantial growth in western Joplin. To facilitate this growth, a fourth major north/south corridor is proposed. Using the traffic model created for this project (and a comparison of future conditions with and without a typical/default bypass) it was possible to demonstrate the community development and economic development impacts in several ways. Assuming that economic development is proportionally related to the number of vehicle movements, the traffic model demonstrated that the region's total daily system capacity would be lower under the nonbypass scenario. This is a macroscopic view of the negative consequences of failing to provide needed infrastructure. A microscopic view of potential negative community development impacts is possible by examining the quality-of-life issues associated with increases in traffic on internal (neighborhood) streets. The traffic model demonstrated that a bypass scenario would substantially reduce traffic on some of streets. **Section B.1.** discusses this issue extensively. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent do alternatives support the community's development goals?

Characterizing this critical element should focus on traditional planning metrics. Existing planning documents may provide locally relevant examples.

b. Evaluation Criteria for Critical Element 2

Negative economic development consequences are expected from failing to accommodate the large economic generators being developed in western Joplin. The prototypical large generator is the recently opened Downstream Casino Resort. Other generators exist and more are expected. This critical element focused on northern routes to this area. Using the traffic model, it was possible to demonstrate that with a bypass, the vehicle trips (and the economic vitality of the area) will be much higher than under nonbypass scenarios. The increase in trips is higher than predicted for strictly for casino purposes. This was taken as an indication that a bypass would support the type of economic development desired by community. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent do alternatives appropriately balance trips to southwestern Joplin?

The ways to characterize the impact of accommodating movements to southwestern Joplin should focus not only on the total volumes of trips, but also on the distribution of trips. The northern roadway system is fairly simple, composed of Route 26, US Route 166/US Route 400, and Route 66. The basics of the evaluation criteria could include 1) the higher the total trips, the better and 2) the more that the predicted volumes conform to the type/design guidelines of the road, the better.

c. Evaluation Criteria for Critical Element 3

Negative consequences are possible from inefficiently utilizing the interchanges to I-44. The examination of this critical element focused on the bypass-related impacts to the traffic volumes coming to southwestern Joplin from I-44. The potential for negative consequences to I-44 exists because of increases in traffic using this southern pathway. Using the traffic model, it was possible to demonstrate that a typical/default western bypass would divert substantial amounts of traffic, which would otherwise use I-44, to access southwest Joplin. In order to assist in the development and evaluation of alternatives to address this critical element, the following metric is proposed:

Evaluation Criteria: To what extent would alternatives improve the I-44 interchanges?

Interstate 44 is vital to the mobility needs of Joplin. Many of the Joplin interchanges (Exits 6, 8, 11, and 18) have safety, operation, and geometric issues. Characterizing this critical element should focus on standard operation characteristics, such LOS. Alternatives that minimize impacts to the operations on I-44 should be considered superior.

Appendix A
Exhibits

Appendix A: Exhibits

This appendix contains the following exhibits:

1. Exhibit A-1 Vicinity Map
2. Exhibit A-2 Future Projects
3. Exhibit A-3 Important Resources/Aerial Map
4. Exhibit A-4 TAZ Map
5. Exhibit A-5 O/D Survey Map Interview Stations and Total Trips
6. Exhibit A-6 Base Case Model Results
7. Exhibit A-7 2035 Model Results (without Bypass)
8. Exhibit A-8 2035 Results (with a Western Bypass)

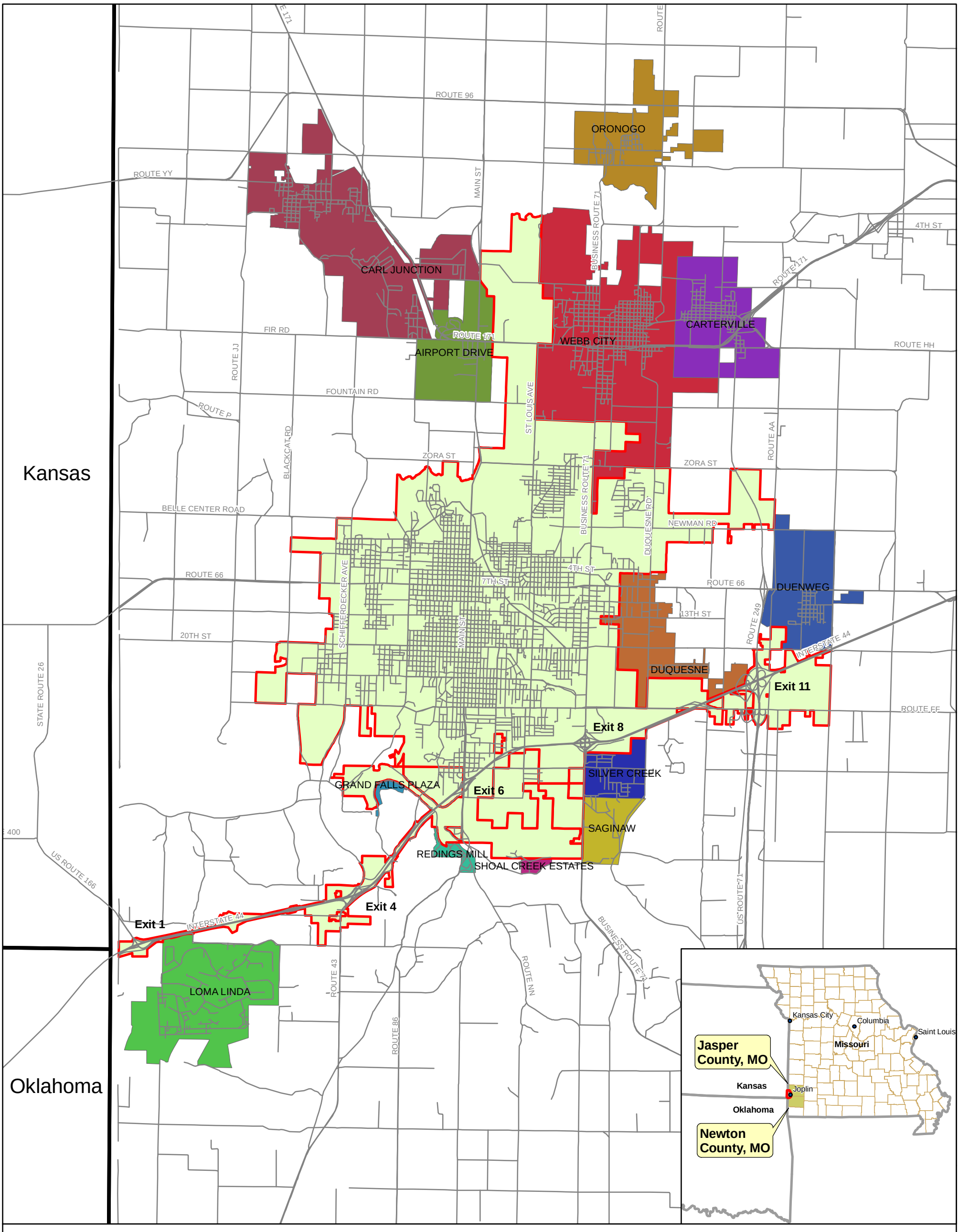


Exhibit A-1
Vicinity Map
West Joplin Purpose and Need Statement

Legend

- Joplin City Limits
- State Boundary

Municipalities

- Airport Drive
- Carl Junction
- Carterville
- Duenweng
- Duquesne
- Grand Falls Plaza
- Loma Linda
- Orongo
- Redings Mill
- Saginaw
- Shoal Creek Estates
- Silver Creek
- Webb City

N

0 8,000 16,000 Feet

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JOPLIN METROPOLITAN AREA

LONG RANGE TRANSPORTATION PLAN - 2005 UPDATE

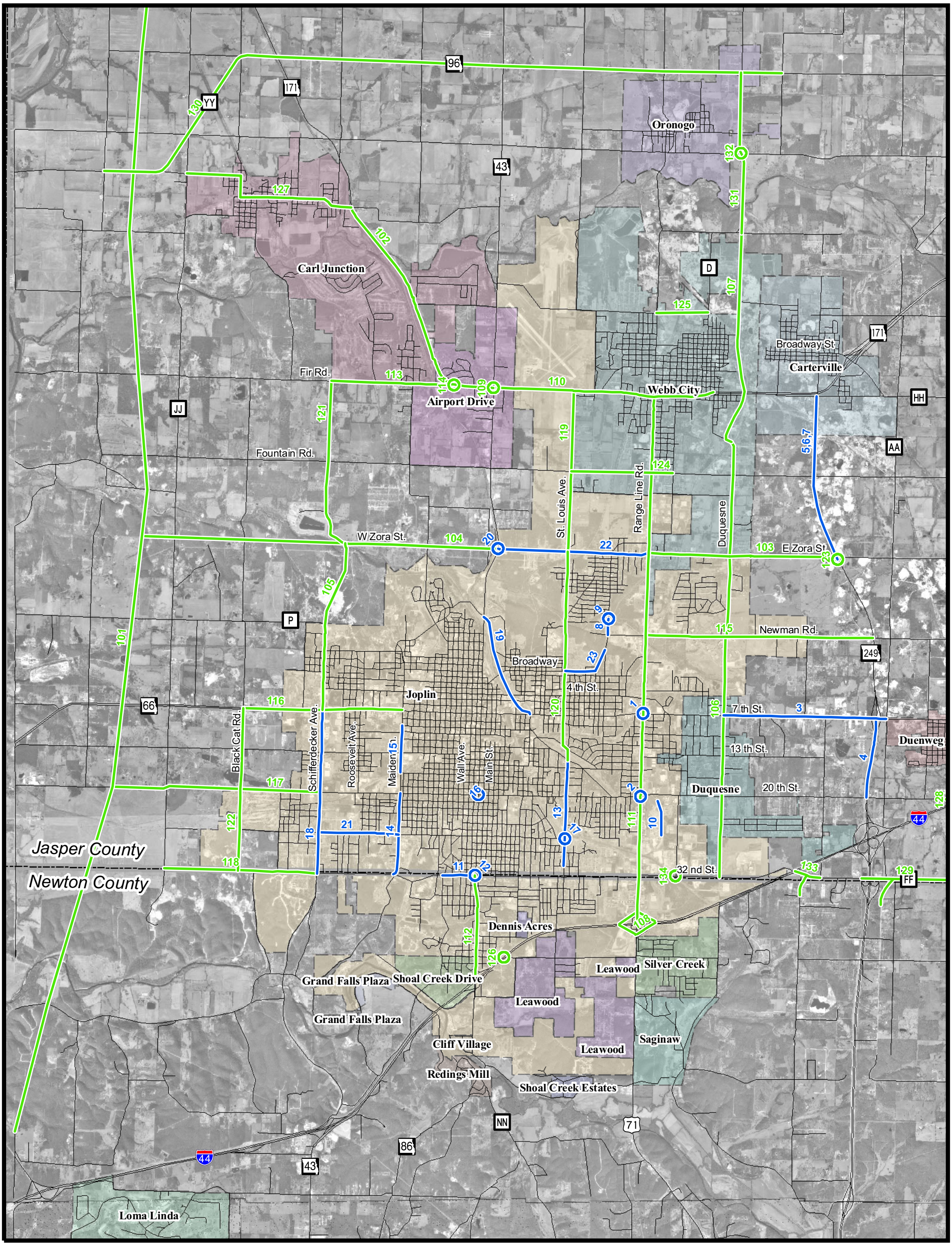


EXHIBIT 3-2

Future Projects

Joplin Area Transportation Study Organization (JATSO)

HNTB

Future Projects

Programmed Projects

Long Range Projects

NOTE: Refer to Tables 3-1 and 4-3 for Project Descriptions

0 0.5 1 1.5 Miles

Carl Junction
Joplin Regional Airport
Webb City
Center Creek
Joplin Webb City Industrial Park
Kansas
Galena, Kansas
Schifferdecker Park
Sunshine Historic District
Missouri Southern State University
Downtown Joplin
Joplin Southern Industrial Park
MODOT District Office
Wildwood Ranch
St. John's Regional Medical Center
Hammon's Convention and Trade Center
Exit 11
Freeman West Hospital
Exit 8
Crossroads Center Business Park
Exit 6
Shoal Creek
Exit 4
Exit 1
Downstream Casino Resort
Oklahoma

Exhibit A-3
Important Resources/Aerial Map
West Joplin Purpose and Need Statement

N

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Exhibit A-4
TAZ Map
West Joplin Purpose and Need Statemant

Legend

Joplin TAZ

N

0 6,000 12,000 Feet

1 inch equals 6,000 feet

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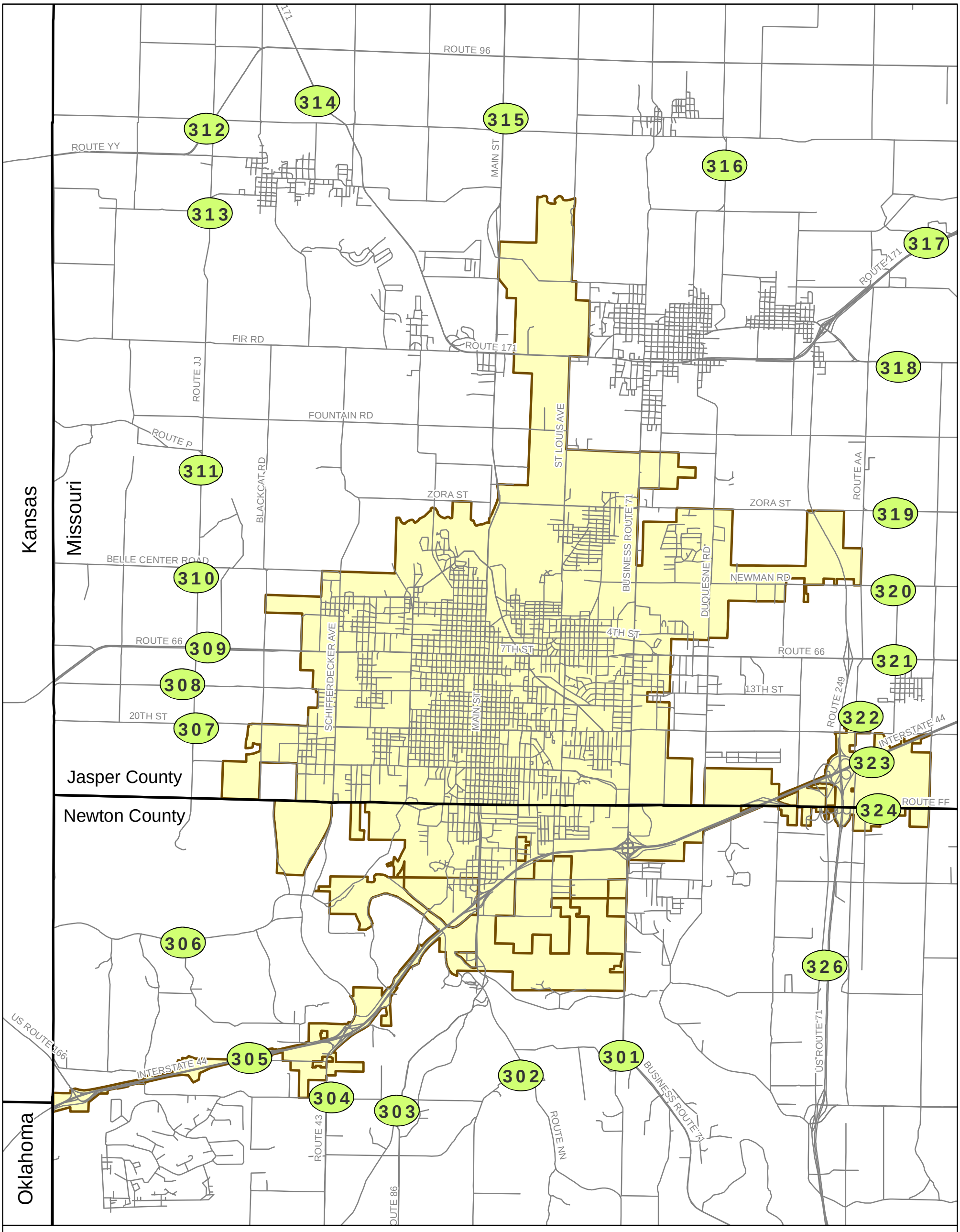


Exhibit A-5
O/D Survey Map Interview Stations and Total Trips
West Joplin Purpose and Need Statement

Interview Station	Location	Total Trips
301	BS 71 (Rangeline South)	6757
302	Route NN	2403
303	Highway 86	2615
304	Highway 43 (South Side)	9437
305	Interstate 44 (West Side)	29263
306	Bagdad Road	2449
307	20th Street (West Side)	2972
308	Junge Boulevard	807
309	Route 66 (7th St. - West Side)	10380
310	Belle Center Road	1126
311	Route P	760
312	Route Z	1618
313	Route JJ	2139
314	Highway 171 (West Side)	4700

Interview Station	Location	Total Trips
315	Highway 43 (North Side)	8484
316	Route D	4980
317	Highway 171 (East Side)	11636
318	Route HH	5780
319	Route AA	946
320	Newman Road	1196
321	Route 66 (7th St. - East Side)	10253
322	20th Street (East Side)	3226
323	Interstate 44 (East Side)	37312
324	Route FF (32nd St.)	10737
325	Warner Road	729
326	US Highway 71	19137
Total Trips		**191842**

Legend

- mo_counties
- Joplin City Limits
- Interview Station

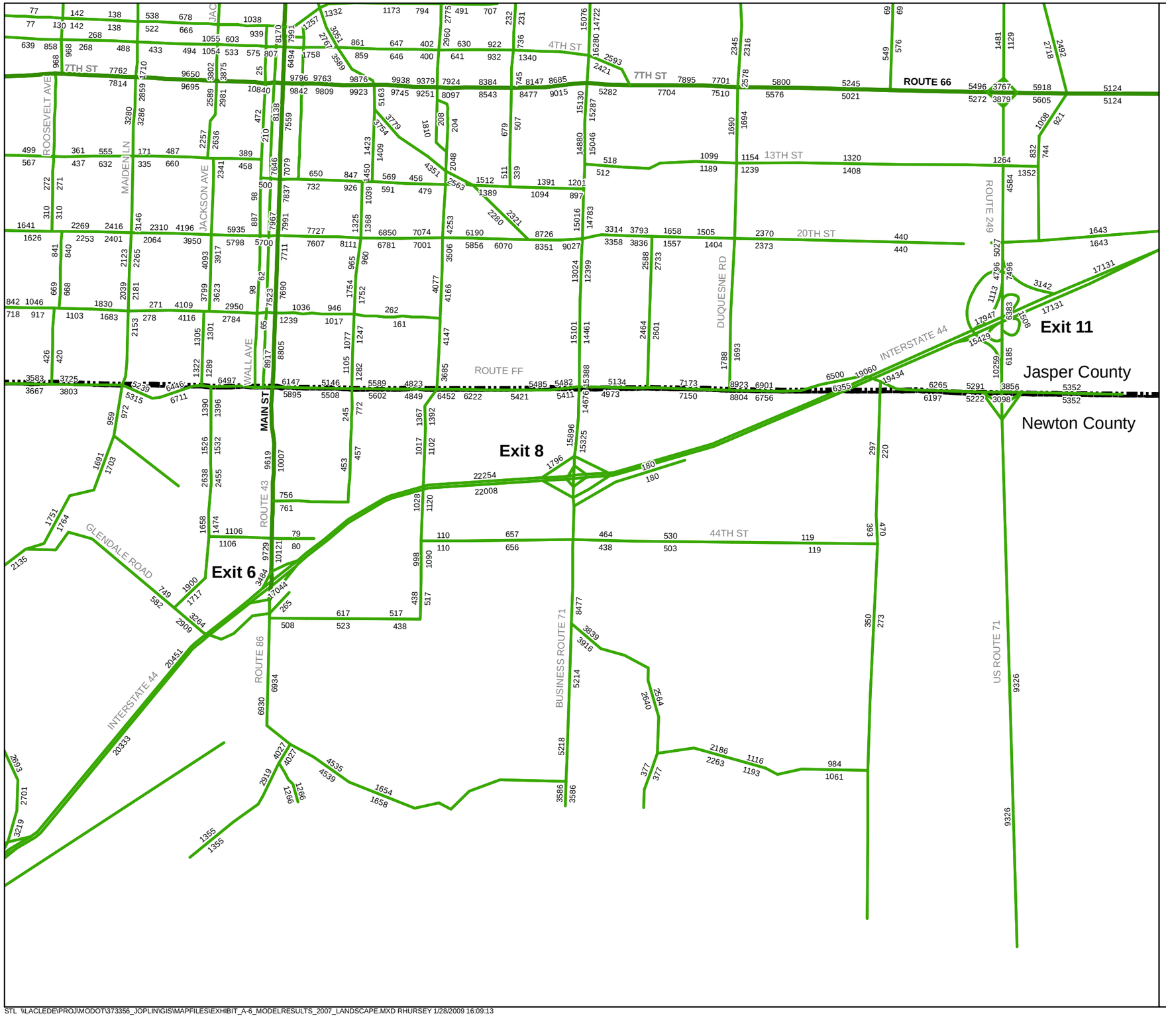
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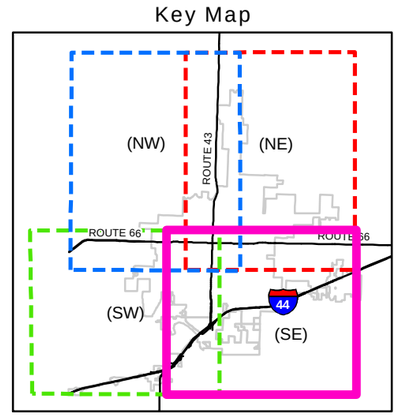
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Source: ETC Institute - Joplin 2007 Regional O/D Survey

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Exhibit A-6 (SE)
Base Case Model Results (Existing)
West Joplin Purpose and Need Statement





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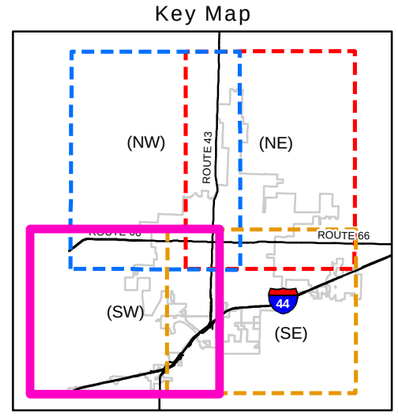
0 3,500 7,000 Feet

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for the base case (existing).

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Exhibit A-6 (SW)
Base Case Model Results (Existing)
West Joplin Purpose and Need Statement



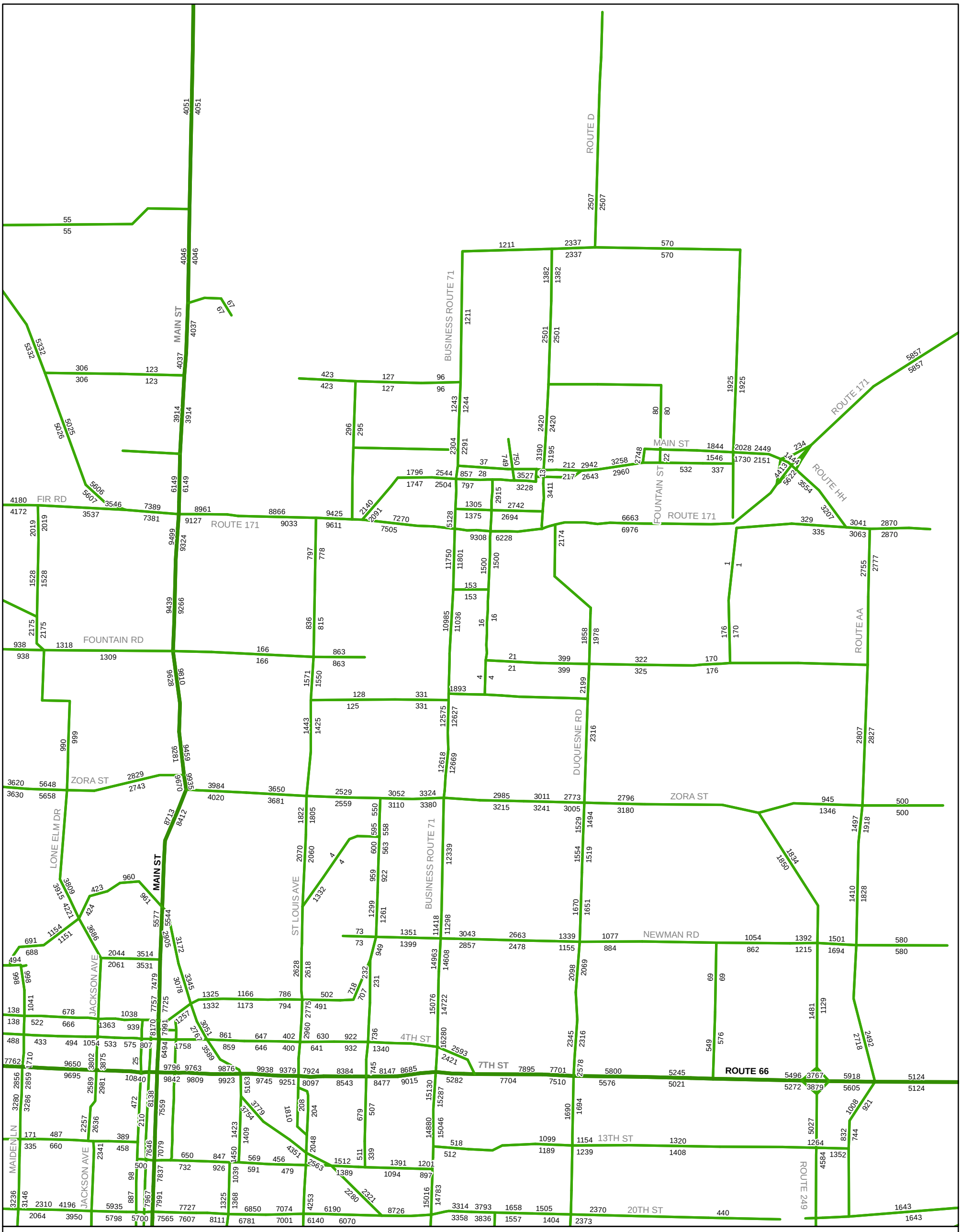


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0 3,500 7,000 Feet

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for the base case (existing).

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Key Map

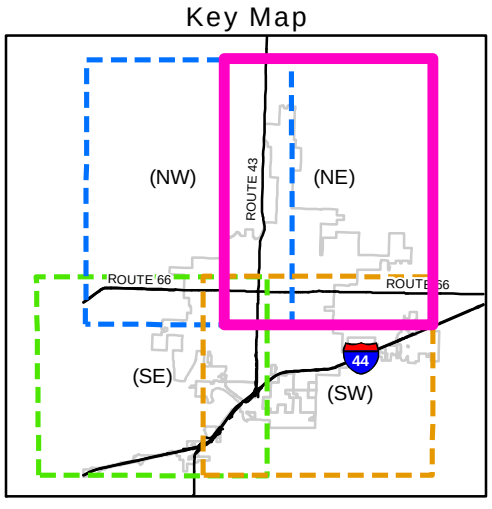


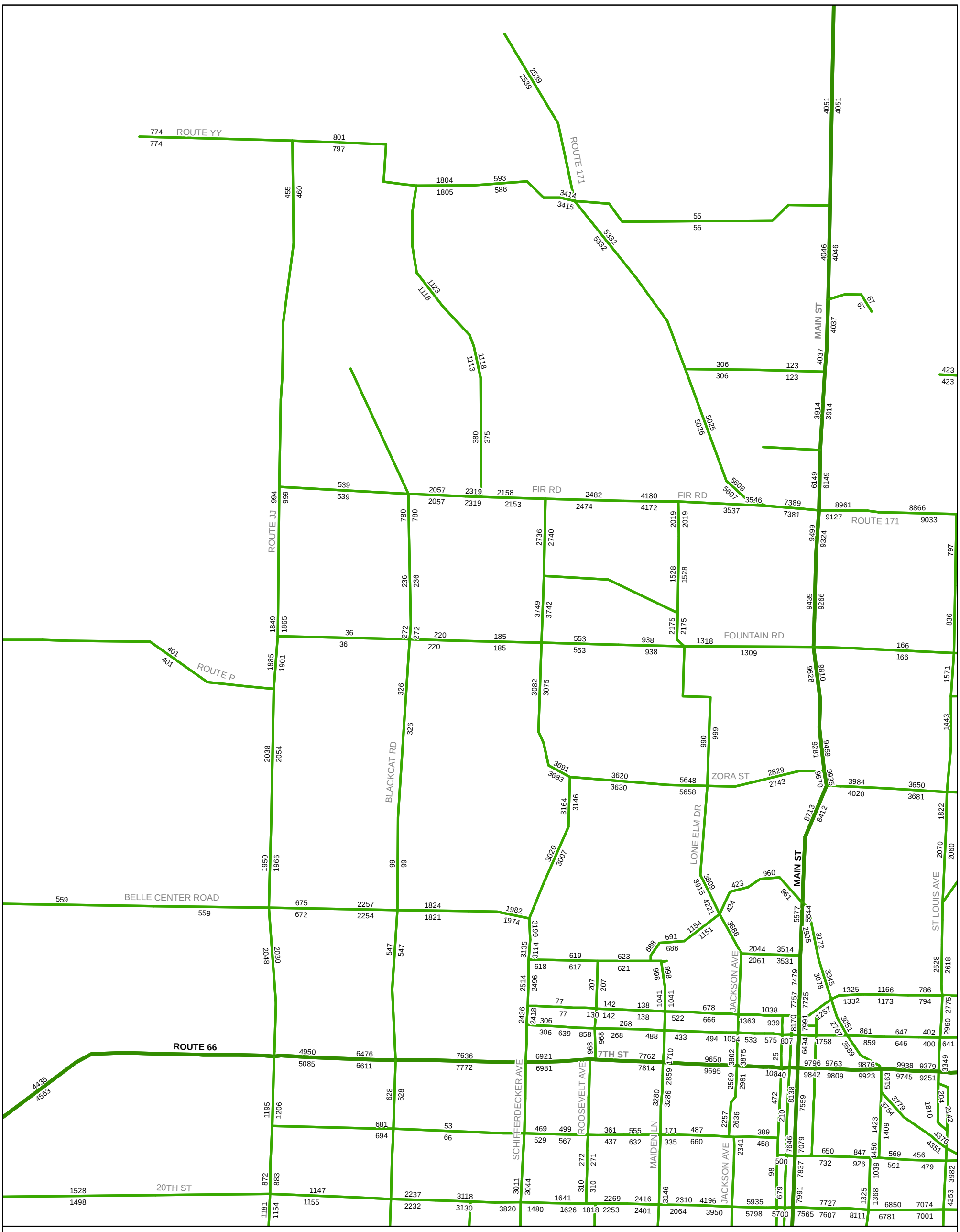
Exhibit A-6 (NE)
Base Case Model Results (Existing)
West Joplin Purpose and Need Statement

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for the base case (existing).

N

0 3,500 7,000
Feet

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Key Map

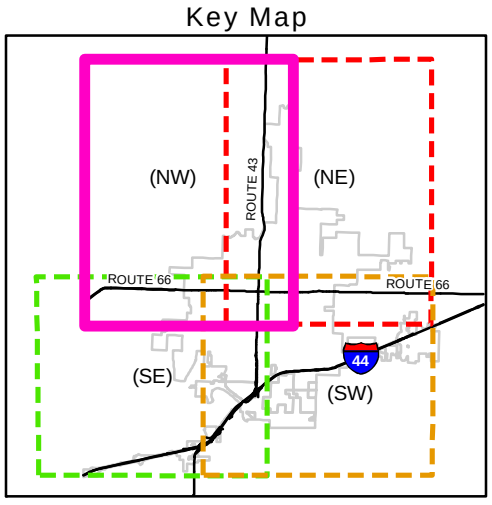


Exhibit A-6 (NW)
Base Case Model Results (Existing)
West Joplin Purpose and Need Statement

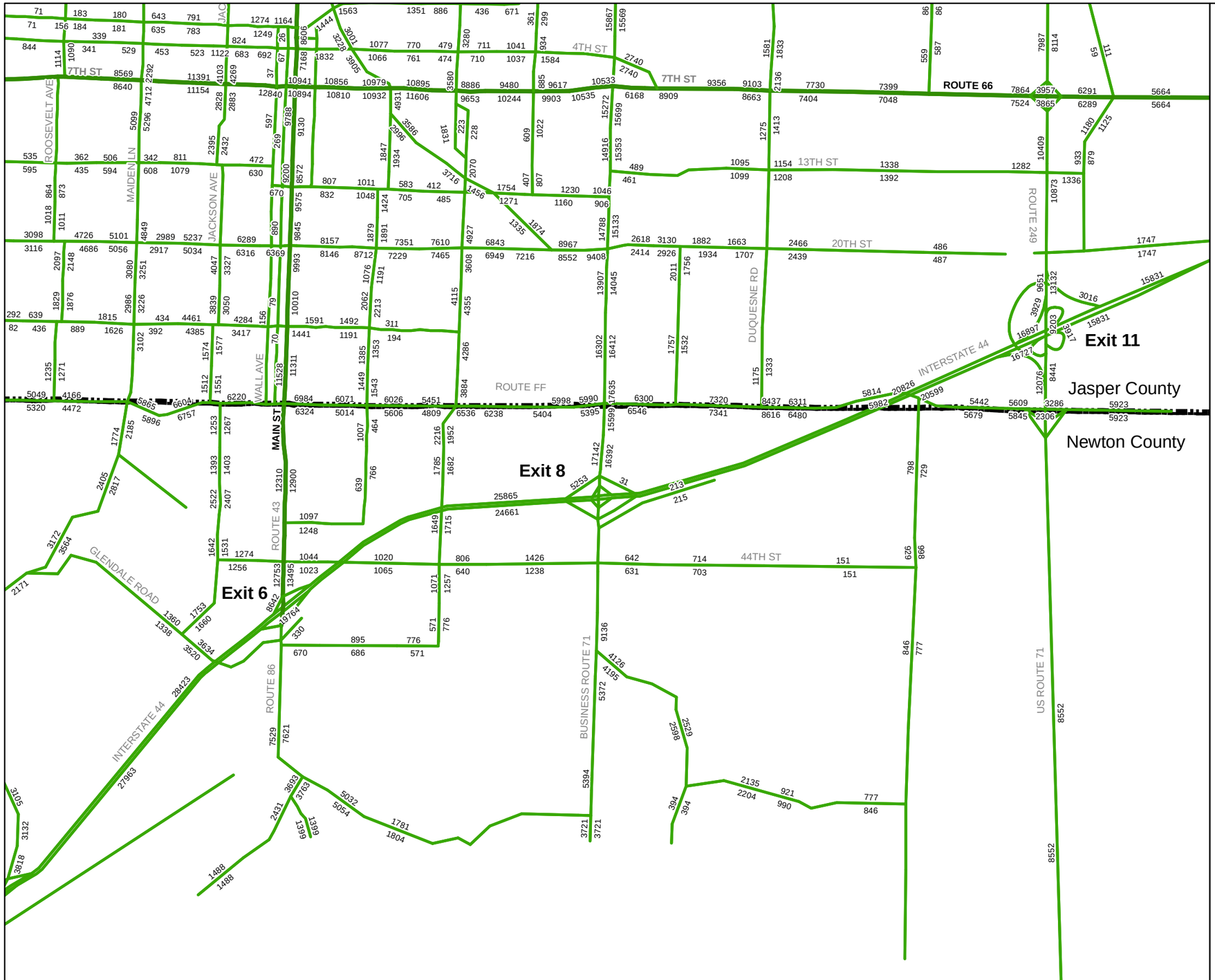
Note:
Volumes depicted represent the Average Daily Traffic (ADT) for the base case (existing).

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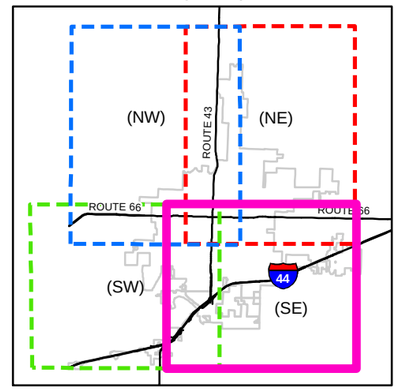
0 3,500 7,000
Feet

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Exhibit A-7 (SE)
2035 Model Results (without Bypass)
West Joplin Purpose and Need Statement



Key Map



N

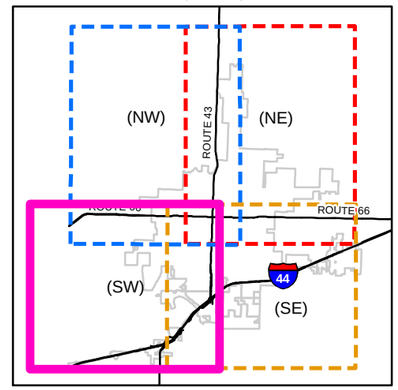
0 3,500 7,000 10,500 Feet

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for 2035 (without bypass).

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Exhibit A-7(SW)
2035 Model Results (without Bypass)
West Joplin Purpose and Need Statement





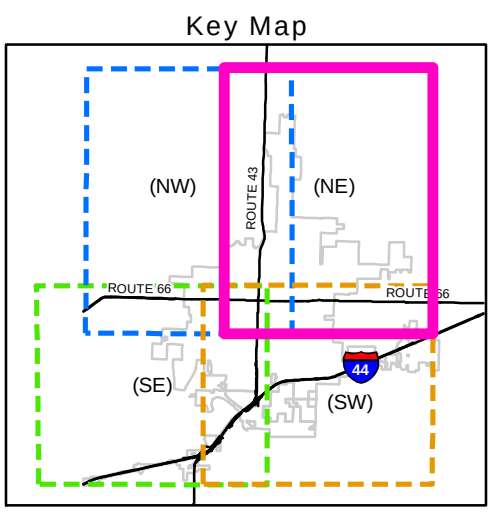
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Note:
Volumes depicted represent the Average Daily Traffic (ADT) for 2035 (without bypass).

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Exhibit A-7 (NE)
2035 Model Results (without Bypass)
West Joplin Purpose and Need Statement

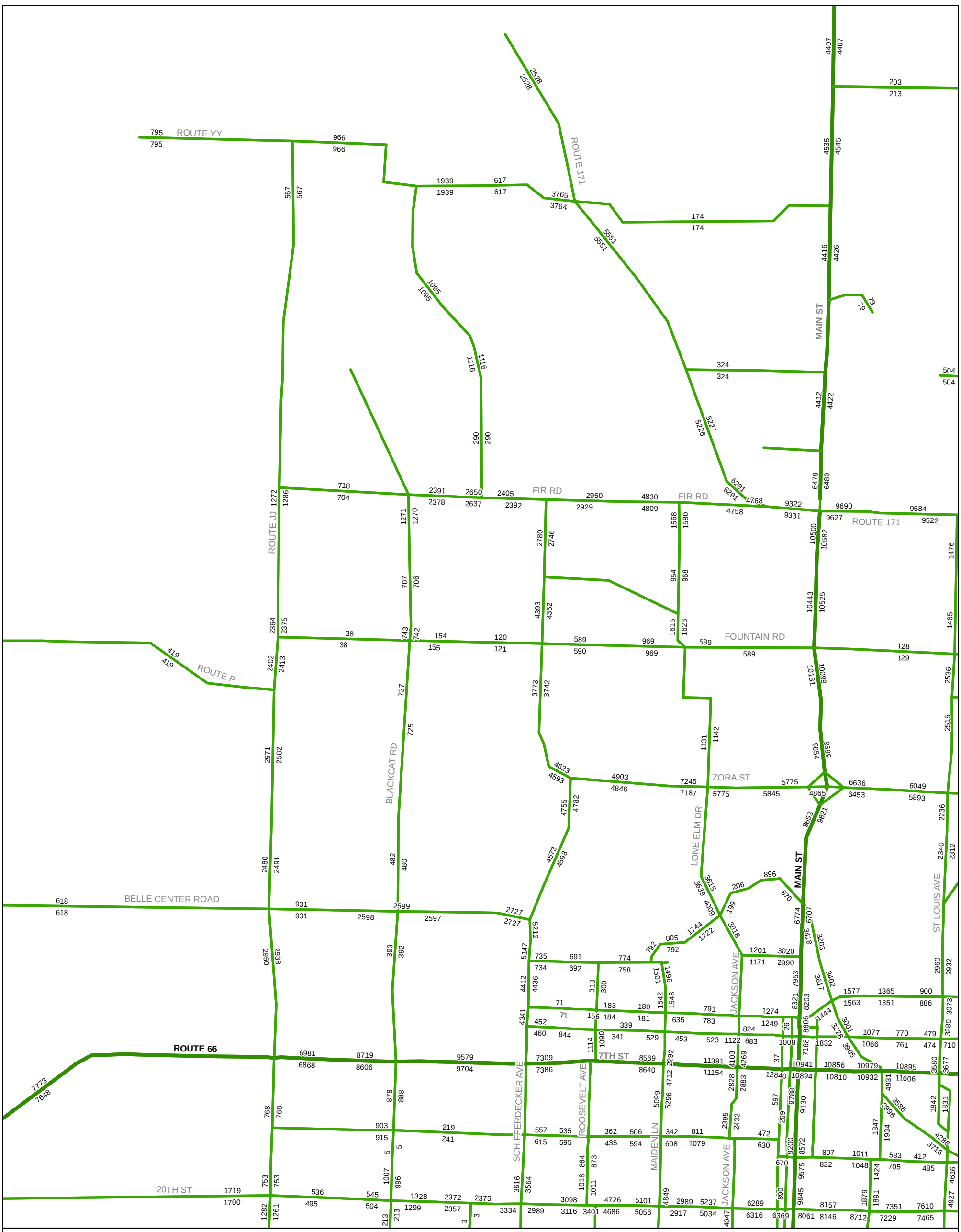


Note:
Volumes depicted represent the Average DailyTraffic (ADT) for 2035 (without bypass).

N

0 3,500 7,000
Feet

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Key Map

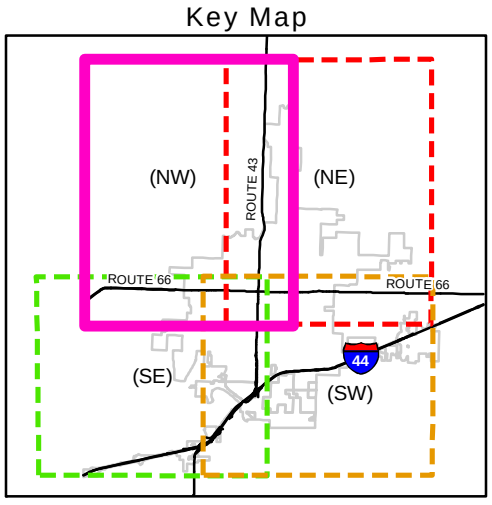


Exhibit A-7 (NW)
2035 Model Results (without Bypass)
West Joplin Purpose and Need Statement

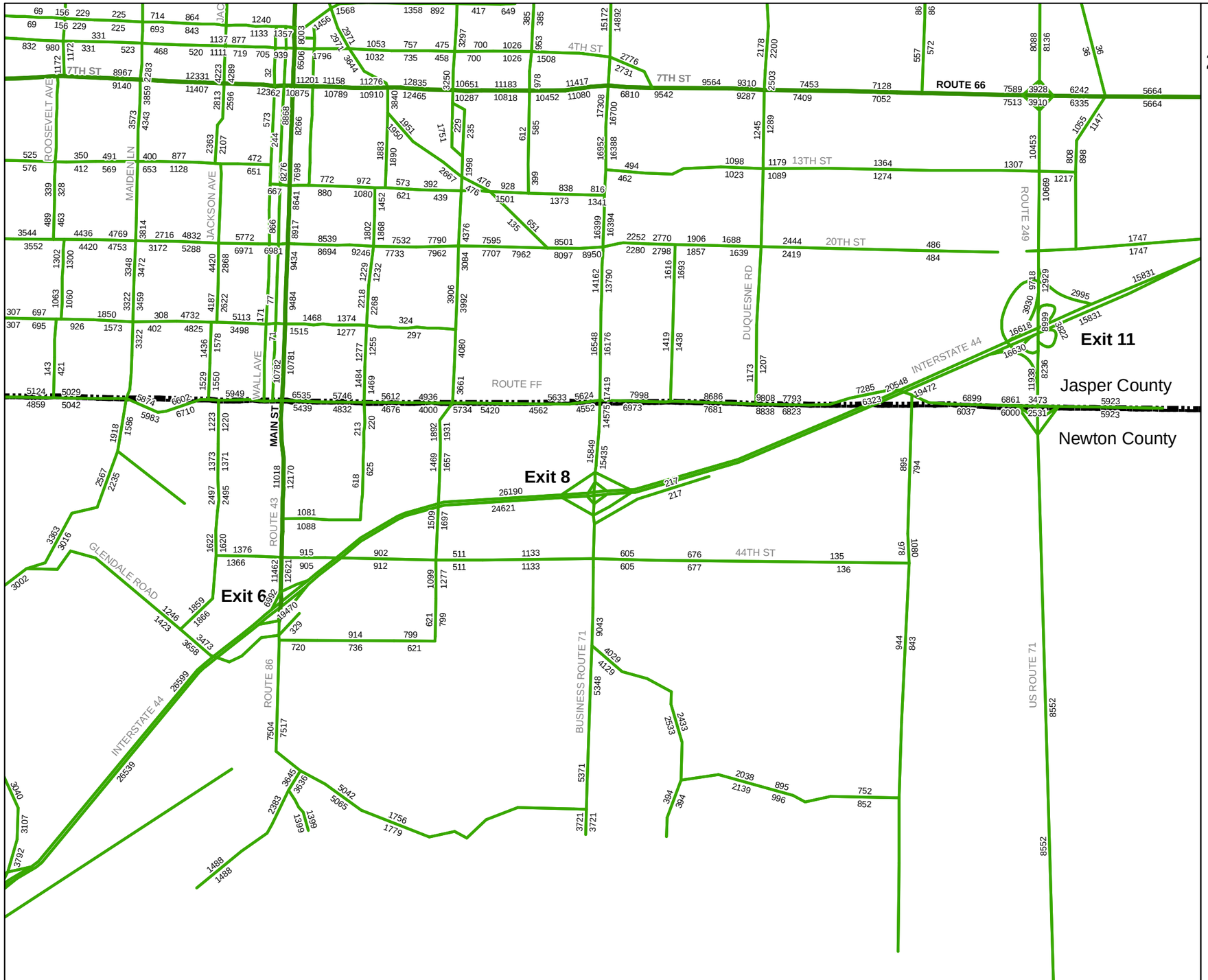
Note:
Volumes depicted represent the Average DailyTraffic (ADT) for 2035 (without bypass).

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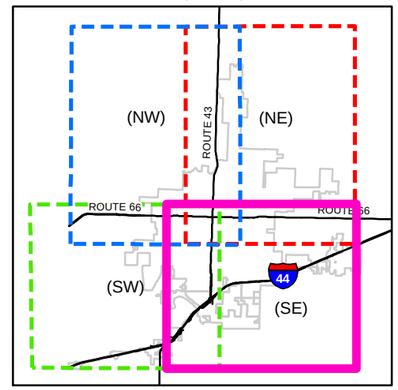
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Exhibit A-8 (SE)
2035 Model Results (with a Western Bypass)
West Joplin Purpose and Need Statement



Key Map



N

0 3,500 7,000 10,500 Feet

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for 2035 (with a Western Bypass).

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Exhibit A-8 (SW)
2035 Model Results (with a Western Bypass)
West Joplin Purpose and Need Statement

Kansas

Missouri

Cherokee County

Jasper County

Newton County

ROUTE 66

20TH ST

7TH ST

SCHIFFERDECKER AVE

ROOSEVELT AVE

MAIDEN LN

JACKSON AVE

WALL AVE

MAIN ST

ROUTE 43

ROUTE 86

STATE ROUTE 26

US ROUTE 400

US ROUTE 166

(Western Bypass)

GLENDALE ROAD

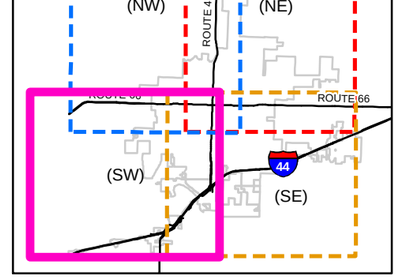
INTERSTATE 44

Exit 1

Exit 4

Exit 6

Key Map

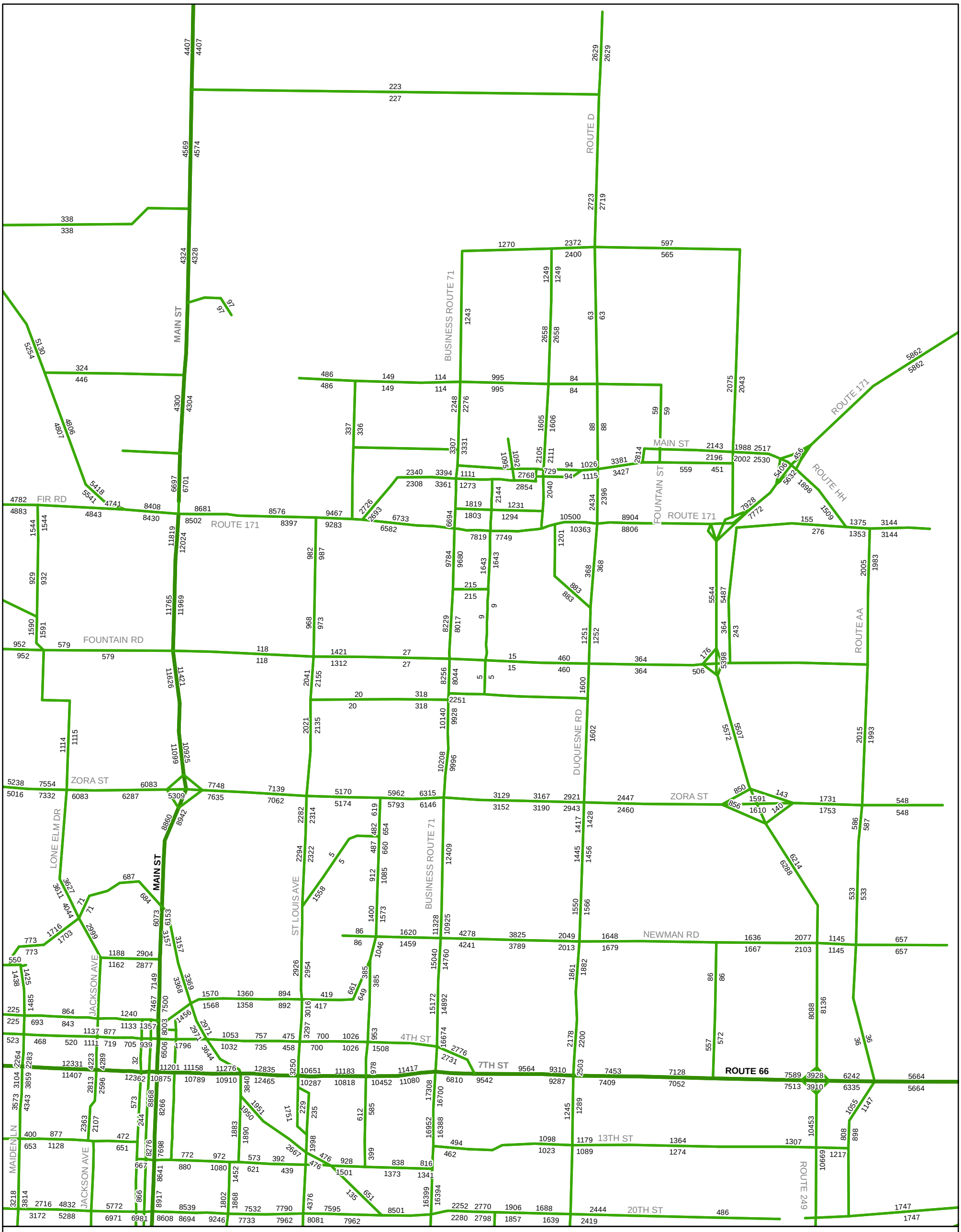


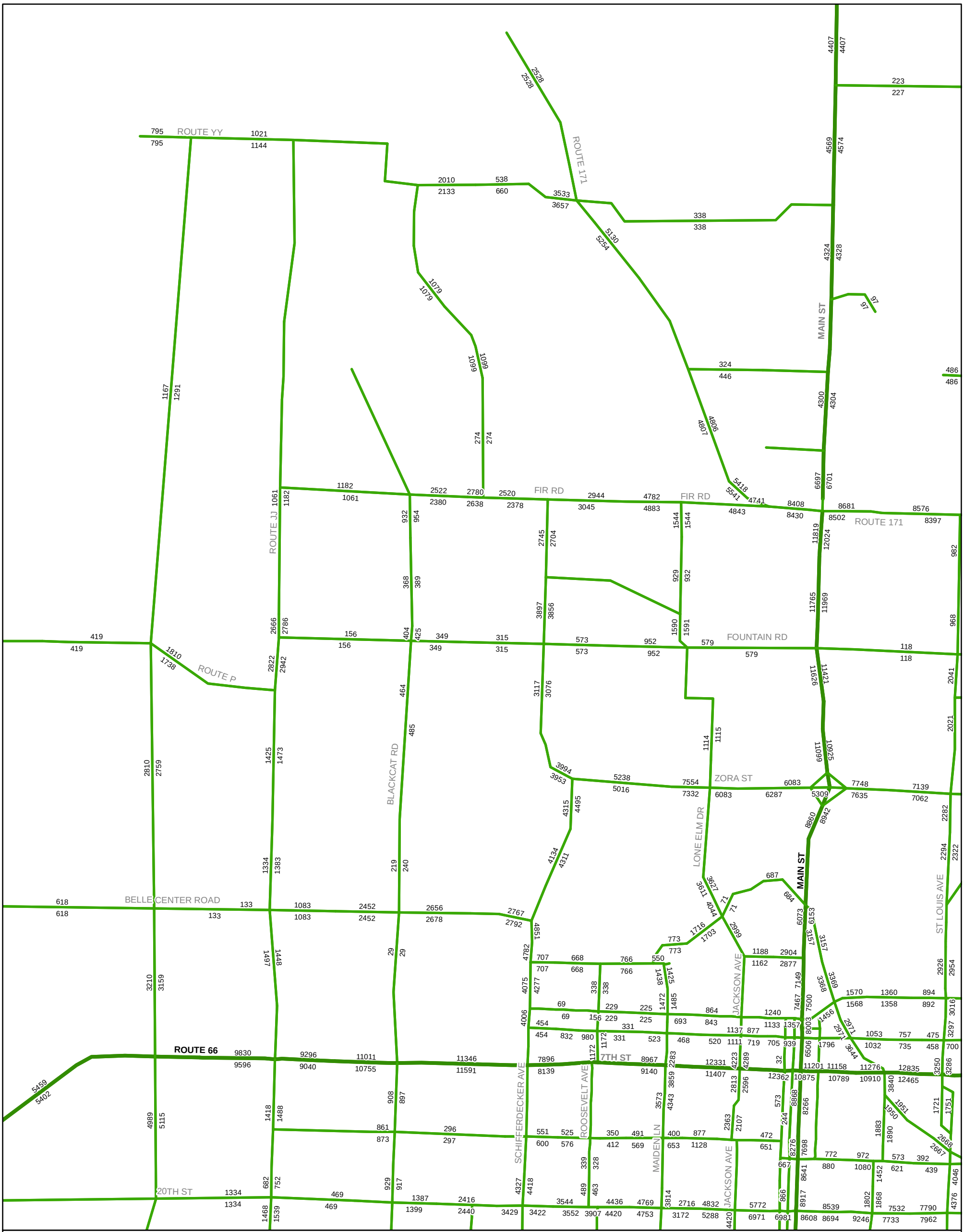
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0 3,500 7,000 10,500 Feet

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for 2035 (with a Western Bypass).

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MAIN ST
ROUTE D
BUSINESS ROUTE 71
ROUTE 171
FIR RD
FOUNTAIN RD
ZORA ST
LONE ELM DR
ST LOUIS AVE
JACKSON AVE
MAIDEN LN
DUQUESNE RD
NEWMAN RD
FOUNTAIN ST
ROUTE HH
ROUTE AA
4TH ST
7TH ST
13TH ST
20TH ST
ROUTE 66
ROUTE 249
4407
4569
4574
4324
4328
4300
4304
4806
4807
5130
5254
5418
5541
4741
4782
4883
4843
8408
8430
8681
8502
8576
8397
9467
9283
6697
6701
2726
2693
6733
6582
2629
2723
2719
1270
2372
2400
597
565
1249
1243
2658
63
486
149
114
995
84
2075
2043
5862
456
5406
5632
1898
1509
7928
7772
155
276
1375
1353
3144
2005
1983
5544
5487
364
243
176
5398
506
2248
2276
337
336
3307
3331
1605
1606
88
59
2143
2196
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2530
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3381
3427
2814
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1803
1231
1294
2144
2040
2105
2111
2434
2396
10500
10363
8904
8806
1201
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Key Map

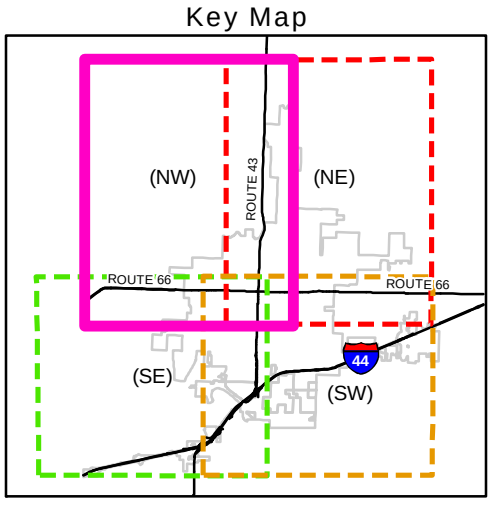


Exhibit A-8 (NW)
2035 Model Results (with a Western Bypass)
West Joplin Purpose and Need Statement

Note:
Volumes depicted represent the Average Daily Traffic (ADT) for 2035 (with a Western Bypass).

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Appendix B
Public Involvement Documents

Appendix B: Public Involvement Documents

This appendix contains supporting materials pertaining to West Joplin Purpose and Need Statement's public involvement activities. The materials in this appendix include:

1. Summary of public involvement plan
2. Stakeholder list, kickoff letters, and responses
3. Press coverage
4. JATSO presentation – January 15, 2009

1. Summary of Public Involvement Plan

Public involvement is an important component of project development. Not only is public involvement the right thing to do, it is the law. There are numerous state and federal legal requirements associated with public involvement. For example, the National Environmental Policy Act (NEPA) and the Federal Highway Administration (FHWA) require stakeholder involvement during planning and environmental processes.



NEPA requires an "effective" public involvement plan.

The purpose of public involvement is to share information and solicit ideas in order to develop the best possible approach to a project. It is important to stress that public involvement is a dialogue between the project team and the project's stakeholders. This means that each side is dedicated to listening and learning from each other. It is through this process of sharing ideas that public involvement achieves its goal of improving decision-making. There are numerous techniques to create an environment where a successful dialogue can flourish. Not all techniques are applicable to every project or situation.

This public involvement plan (PIP) establishes the approach and philosophy of MoDOT and the consultant study team for identifying and engaging the communities, officials, local citizens, and other potentially affected interests. The goals of the PIP are to provide a clear description of how the study team will solicit input, develop two-way communication with the public, document public opinions regarding the transportation planning process, and achieve informed consent for the study's findings and recommendations.

The work associated with the West Joplin Purpose and Need Statement was organized in terms of four general tasks. The public involvement activities of each task are summarized below:

a. Task 1 – Project Startup

For Task 1, public involvement efforts included the following:

- Coordination among project team technical staffs (MoDOT, City of Joplin, Newton and Jasper Counties, JATSO, and CH2M HILL)
- Interviews with neighboring DOT staff
- Identification of stakeholders
- Establishment of core project team and decision-making strategies

b. Task 2 – Data Collection

For Task 2, public involvement efforts included the following:

- Data requests from project team technical staffs
- Development/dissemination of project kickoff letter to stakeholders
- Stakeholder follow-up and coordination
- Biweekly working sessions with core project team

c. Task 3 – Predictive Modeling/Establishment of Needs

For Task 3, public involvement efforts included the following:

- Stakeholder follow-up and coordination
- Biweekly working sessions with core project team

d. Task 4 – Produce Purpose and Need Statement

For Task 4, public involvement efforts included the following:

- Stakeholder follow-up and coordination
- Biweekly working sessions with core project team
- Summary of public involvement activities in the purpose and need document
- A working session to discuss the preliminary draft purpose and need statement

2. Stakeholder List, Kickoff Letters and Responses

a. Initial Stakeholder List

This list was developed based on coordination among the core project team:

- Carl Junction School District
- Joplin School District
- Mid Central Contractors
- Jasper County Water Supply District 1
- Dean's Cabinet Shop
- Pittsburg State University
- Downstream Casino
- Quapaw Tribe
- Penn National Casino
- FMC west
- St. John's Hospital
- Freeman Hospital
- Jasper County
- Newton County
- Joplin Special Road District
- Joplin Area Chamber of Commerce
- Carl Junction Special Road District
- Joplin Area Transportation Study Organization
- Joplin Regional Airport
- Webb City, MO
- Reddings Mill, MO
- Loma Linda, MO
- Galena, KS
- Kansas Department of Transportation (KDOT)
- Oklahoma Department of Transportation (OKDOT)
- Will Rogers Turnpike Authority
- Wildwood Ranch

b. Kickoff Letter

July 1, 2008

Mike Alley
Chief, External Communications
Public Affairs Office
Fort Leonard Wood, MO 65473

Subject: West Joplin Purpose and Need Study
Jasper and Newton Counties, Missouri
MoDOT Job No. J7P0847

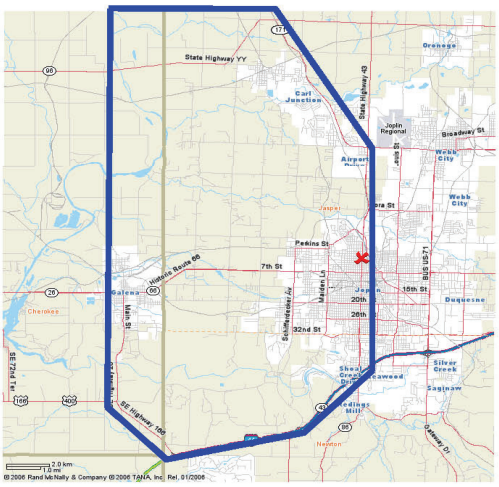
Dear Mike Alley:

The Missouri Department of Transportation (MoDOT) in conjunction with the City of Joplin has initiated a study to identify the transportation issues that may affect the western portions of Jasper and Newton Counties. A consultant team led by CH2M HILL of St. Louis is assisting with the study.

The purpose of this letter is to inform important stakeholders of the project and to initiate a mechanism for interested parties to provide input. In addition to the general contact information provided here, as the study progresses, you will have additional opportunities to provide direct input on the study's findings. We will publicize those events when they are scheduled.

Study Overview

The focus of this study will be to identify existing or future transportation problems. The clear definition of problems will allow for informed decision-making. This type of study is generally referred to as "Pre-NEPA" document. It will not look at solutions; it will however lay the groundwork for future projects that may generate and evaluate alternatives. The specific goals of the Purpose and Need Study are to:



- Identify the transportation problems that affect the study area.
- Investigate the parameters that may be important for determining how well future alternatives address the identified transportation problems.
- Establish logical termini, independent utility, and appropriate study areas. These are important precursors to any future project.

- Present the data (traffic, planning, engineering, and environmental data) that potentially affects the transportation problems. This data will also be vital to any future project.

Summary of Work Tasks

The collection, development and analysis of traffic, planning, engineering and environmental data is the primary task that will be undertaken during the West Joplin Purpose and Need Study.

- **Traffic Data** will be gathered from all available traffic forecasts in order to establish existing conditions. Traffic modeling will be used to estimate future traffic volumes.
- **Planning Data** will be collected from a multitude of sources. This data will provide important background information that will help characterize the study area. This will include crash locations and causes, applicable land use plans, comprehensive plans, and general plans that define the area and any other important community resource data available.
- **Engineering Data** will include cataloging existing vertical and horizontal alignments, important interchange data, design speeds, access management qualities, etc.
- **Environmental Data** will include gathering information about the study area from available sources. This will include natural resources, cultural resources, hazardous waste, and a range of socio-economic data.

We would be grateful to receive any input you have regarding existing or anticipated transportation problems in the portions of Newton and Jasper Counties west of Joplin. We also look forward to working with you as the study progresses. If you have any questions or comments, please contact us at the following locations.

Jerry Davis, P.E.
MoDOT
3901 East 32nd Street
Joplin, MO 64804
417-629-3377
jerry.davis@modot.mo.gov

Kevin Nichols, P.E.
CH2M HILL
727 North 1st Street, Suite 400
St. Louis, MO 63102
314.421.0900
kevin.nichols@ch2m.com

Sincerely,

Missouri Department of Transportation

Jerry Davis, P.E.
Project Manager

CH2M HILL

Kevin Nichols, P.E.
Consultant Project Manager

c. Responses

Brad Henry
Governor
Member Ex-Officio

Phil Tomlinson
Director
Secretary of Transportation

OKLAHOMA TURNPIKE AUTHORITY

3500 Martin Luther King Ave. P.O. Box 11357 • Oklahoma City, OK 73136-0357 • 405/425-3600 • Fax:405/427-8246 • www.pikepass.com

July 23, 2008

Mr. Jerry Davis, P. E.
MoDOT
3901 East 32nd Street
Joplin, MO 64804

Re: West Joplin Purpose and Need Study Jasper and Newton Counties, MO DOT, Job No. J7P0847

Dear Mr. Davis,

Thank you for your notification to this office regarding the referenced needs study. We previously provided you with traffic data last year for the Will Rogers (I-44) Turnpike. Advise us when you need to have that information updated.

The Oklahoma Turnpike Authority plan to construct a Port Entry at approximately MP 326.5 west bound within the next 3 to 5 years. If you need information about that facility please contact the office.

Sincerely,

Jim Hazeldine
Assistant to the Director

cc: Tim Stewart, Chief Operating Officer
Gordon Johnson, Director of Engineering

1

KANSAS
DEPARTMENT OF TRANSPORTATION

Kathleen Sebelius, Governor
Deb Miller, Secretary
http://www.ksdot.org

July 23, 2008

Jerry Davis, P.E.
Project Manager
Missouri Department of Transportation
3901 East 32nd Street
Joplin, MO 64804

Dear Mr. Davis:

Thank you for the opportunity to provide input on the West Joplin Purpose and Need Study. This study, and our Preliminary Engineering Study of US-400 in Cherokee County, will go a long way toward determining the future of transportation in the Pittsburg-Joplin corridor.

Your consultant, CH2M Hill, has already contacted George Dockery, KDOT Pittsburg Area Engineer. He provided you with contact information for our consultant for the US-400 study, GBA. You also can contact Steve Rockers, our Road Design Leader on this study. We are happy to share whatever information is needed to produce good recommendations from these two important studies.

More specifically, I think these issues need to be considered by both of our studies:

1. The flow of traffic between Pittsburg/SE Kansas and Joplin. These two cities are the largest centers of trade in the tri-state region and there is considerable interaction between the two cities. The three state highways that cross the KS-MO border are the three highest-volume border crossings outside of the Kansas City area. The commuters of the region will be very interested in the results of our studies.

2. The flow of traffic from Wichita to Springfield (and points east and west of those). Kansas has made considerable investment in its Southeast Kansas/US-400 corridor. However, the effectiveness of that route for long-distance travel is only as good as its connection to Interstate 44. Recent development along the US-166/US-400 corridor potentially threatens the mobility of east-west traffic, and K-66/M-66 is not viable for through traffic. We would be interested in the possibility of tying US-400 into a new corridor if such a road existed between Joplin and Galena.

3. The flow of traffic from Kansas City to I-44 and points south. US-71 already serves some of this traffic, but US-69 serves other southward travelers, and as we improve it to four lanes, a connection to I-44 becomes more important for reasons similar to those stated for US-400.

2

Mr. Jerry Davis, P.E.
Page Two
July 23, 2008

4. Undermining. As you know, our corridor location alternatives may be limited due to the presence of undermining in the area. This emphasizes the need to coordinate our efforts to build a seamless and logical road network for the area.

There may be other issues that will need to be coordinated as well. Please feel free to contact George Dockery at 620-231-7560 or Steve Rockers at 785-296-3901 for more information. They also can involve other KDOT staff members as needed.

Sincerely,

Jerome T. Younger, P.E.
Deputy Secretary for Engineering and
State Transportation Engineer

c: George Dockery, P.E., Pittsburg Area Engineer
Steve Rockers, P.E., Road Design Leader

OFFICE OF THE SECRETARY OF TRANSPORTATION
Dwight D. Eisenhower State Office Building
700 S.W. Harrison Street; Topeka, KS 66603-3745 • (785) 296-3461 • Fax: (785) 296-1095
TTY (Hearing Impaired): (785) 296-3585 • e-mail: publicinfo@ksdot.org • Public Access at North Entrance of Building

Wildwood Ranch Development, Inc.

August 18, 2008

Jerry Davis, P. W.
MoDot
3901 East 32nd Street
Joplin, MO 64804

RE: West Joplin Purpose and Need Study

Dear Jerry,

I am writing today in support of a By-pass that would serve the west side of Joplin in Jasper and Newton Counties.

As the developer and stakeholder in **Wildwood Ranch**, a 2064 acre Master Planned Community, west of Joplin. I am happy to provide information and will be interested in receiving updated information on the progress and findings of the study.

Personally, I believe that with the growth of Joplin's Medical community, **Wildwood Ranch Development**, Downstream Casino and the potential of another casino being built in Cherokee County, the current infrastructure will prove to be insufficient. We have already seen traffic double on 20th street, near the development, and feel that it will continue to increase as we begin to build. I feel certain that within the next 3 to 5 years, 300 to 1000 people and several businesses ranging from Professional Office to Assembly/Manufacturing employing 100-600 people could easily call **Wildwood Ranch** home increasing the need for better transportation in and around Joplin's west side.

I have enclosed a copy of our Conceptual Plan and if I can be of further assistance please let me know.

Respectfully

James "Jimmer" Pinjuv
Wildwood Ranch

TELEPHONE CONVERSATION RECORD

From: Jerry.Davis@modot.mo.gov [mailto:Jerry.Davis@modot.mo.gov]
Sent: Wednesday, July 09, 2008 9:16 AM
To: Nichols, Kevin/STL
Subject: response from Carl Junction School District, West Bypass

Received a call from Phil Cook Superintendent of Joplin School District in response to our Stakeholders letter. His comments:
the area is growing rapidly as far as new housing. The school district is averaging a growth of 85 students per year for the last 12 years.
Cedar Ridge is a subdivision that is growing rapidly.
If the Wildwood development gets started they we look at putting a new school in the area.
The School district has paid Tri-State Engineering to develop a scattergram of the students last year and would share with us if needed.
He would be willing to provide whatever information he has available to us.

Jerry Davis, P.E.
Transportation Project Manager
Missouri Department of Transportation
District 7, 3901 East 32nd Street
Joplin, MO 64802
Phone 417-629-3377
Fax 417-629-3314

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1

TELEPHONE CONVERSATION RECORD

From: Jerry.Davis@modot.mo.gov [Jerry.Davis@modot.mo.gov]
Sent: Tuesday, July 22, 2008 1:59 PM
To: Nichols, Kevin/STL
Subject: response to stakeholder letter

Kevin,
This is the second response to the stakeholder letters.
Penn National is the gaming company in Kansas that has not built yet near Exit 1 north side I44.
Wayne who is with Shafer, Kline & Warren, Inc , was forwarded the letter from Penn National and asked to respond.
In our phone conversation he said that they would certainly view a west corridor as a benefit to the property owned by Penn National.
He would like to be notified of any upcoming meetings or developments.

Jerry Davis, P.E.
Transportation Project Manager
Missouri Department of Transportation
District 7, 3901 East 32nd Street
Joplin, MO 64802
Phone 417-629-3377
Fax 417-629-3314

----- Forwarded by Jerry P Davis/D7/MODOT on 07/22/2008 01:51 PM -----

"Whitehead, Wayne" <whitehead@SKW-INC.COM>
07/21/2008 11:35 AM

To <jerry.davis@modot.mo.gov>
cc "Norman Nelms" <Norman.Nelms@pngaming.com>, "Vandelicht, Gary" <vandelicht@SKW-INC.COM>
Subject West Joplin Purpose and Need Study

Jerry:

As I mentioned to you in phone conversation a few minutes ago, Penn National Gaming referred your Stakeholder letter dated July 7, 2008 to me. We have been working on Transportation & Traffic issues
with Penn National on the new gaming facility. If we can be of any assistance to you as you move forward
with this study, please do not hesitate to contact us.

R. Wayne Whitehead, P.E.
Director at Large
Shafer, Kline & Warren, Inc
Office: 573-214-0335 / Cell: 660-281-1050
E-mail: whitehead@skw-inc.com

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3.

TELEPHONE CONVERSATION RECORD

From: Jerry.Davis@modot.mo.gov [mailto:Jerry.Davis@modot.mo.gov]
Sent: Friday, August 08, 2008 3:30 PM
To: Nichols, Kevin/STL; Matthew.Burcham@modot.mo.gov; Timothy.Redmond@modot.mo.gov; tbolande@joplinmo.org
Subject: contact with George Dockery KDOT

Kevin,
I was able to chat with Mr. Dockery about the West Corridor Purpose and Needs Study and try and clarify the issue about the future of Rte 400 tying into I44. KDOT's study is just beginning so they really don't have much data to share a this point. They were somewhat concerned about capacity issues if they tied into I44 and we did the same at mile marker 1. He said that he thought that KDOT would rather partner with MoDOT since tying into I44 on the OK side would involve the toll road and possibly Indian territory. I mentioned that the OK Turnpike Authority mentioned that they plan to construct a port entry at MP 326.5. This appears to be straight south of western boundary of our study area at S Rd 680. He did not seem to be aware of this.

Jerry Davis, P.E.
Transportation Project Manager
Missouri Department of Transportation
District 7, 3901 East 32nd Street
Joplin, MO 64802
Phone 417-629-3377
Fax 417-629-3314

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3. Press Coverage

Chamber official: Study suggests increase in traffic entering Joplin

— By Wally Kennedy
wkennedy@joplinglobe.com
Joplin is a commuter town.
A new study of traffic origination and destination, undertaken in October 2007, suggests a 26 percent increase in external traffic since the last traffic study was conducted in 1999.
The estimated total number of trips entering and exiting the Joplin area has increased from 152,738 daily in 1999 to 191,842 daily in 2007, according to the ETC Institute, which conducted both the 1999 and 2007 studies for the Joplin Metropolitan Planning Organization. Joplin, Carl Junction and Webb City are members of that organization. Based on the study, representatives of the organization estimate that the metropolitan area's population swells to 220,000 on a daily basis, up from 200,000 in 1999.
Chris Tatham, representing ETC, said Joplin is an unusual place when compared with other metropolitan areas.
"We have done 20 or so of these traffic studies, including places like Kansas City, Buffalo (N.Y.), Raleigh-Durham (N.C.) and Fayetteville (N.C.), and we have never seen anything quite like Joplin," he said.
"Joplin is not a large city, but it provides employment for an area that is much larger than itself. Joplin is a significant employment center. More people are coming here than actually live here."
The results of the new study were released Thursday during a committee meeting at Joplin City Hall. Gary Shaw, a member of the Joplin City Council, was among those attending.
"I think it looks positive for Joplin," Shaw said. "We've got more people coming to Joplin than ever before."
Rob O'Brian, president of the Joplin Area Chamber of Commerce, said the traffic increase reflects the population growth that has occurred in the area, and the growth in the retail sector that includes restaurants, new storefronts and the medical community.
"Joplin is reaching out and drawing people in," O'Brian said. "When we get calls from real-estate brokers and consultants who are looking for new retail locations and small-business sites, we can use this study to show them we are not a small, Midwestern city of 47,000 to 48,000 people.
"This study shows them the traffic count in the immediate Joplin area on a daily basis. It really speaks to what the real market is. When we say Joplin serves a market that is as far away as an hour, a market that is 400,000-plus people, we can back it up with this traffic study. Joplin serves a bigger market than just itself."
Officials say the study suggests that on any given day, an estimated 115,000 to 118,000 people who live outside the immediate area enter the Joplin area. Nearly 40 percent of them come here to work or to do something that is work-related. About 17 percent of the trips were for shopping.
The 115,000 to 118,000 estimate is based on 96,902 inbound vehicles per day. The study suggested that 85 percent of the people in those vehicles were not residents of the metropolitan area. The average vehicle occupancy was 1.43 people.
The study cost $80,000. Eighty percent of the cost was covered by federal transportation planning funds, according to Troy Bolander, Joplin's city planner. The city of Joplin

provided the 20 percent local match.
The purpose of the study was to determine travel characteristics and trends in the Joplin region. The study involved the collection of traffic counts at 26 locations around the perimeter of the Joplin Metropolitan Area.
Each survey station was in operation from 7 a.m. to 6 p.m. The procedure involved stopping a random sample of vehicles. Each motorist was asked the origin, destination and purpose of the trip. October was chosen because school was in session.
Tatham said the goal was to survey 3,800 vehicles, but that more than 5,500 participated. The participation rate, he said, was a phenomenal 99.9 percent.
The study suggested that a total of 191,842 trips passed through the area via the 26 stations on an average day in 2007. A total of 96,902 entered the region through the 26 stations, and 94,940 left the region through the stations.
The study suggested that 65 percent of the vehicles passing through the 26 stations were registered in Missouri, 10 percent were registered in Oklahoma and 9 percent were registered in Kansas. The remaining 16 percent were from other states.
The highest traffic volumes and greatest number of through trips were recorded on Interstate 44. A survey station east of Joplin on the interstate logged 37,312 trips, with 8,222 of them truck trips. A survey station west of Joplin on the interstate had 29,263 trips, with 9,397 of them truck trips. Only 16 percent of the through trips on Interstate 44 and Highway 71 stopped in Joplin, according to the study estimates.
The internal area of Joplin was divided into 166 zones. A local trip is a trip that had either the origin or destination within one of the internal zones.
Local trips accounted for 136,138 trips, or 71 percent of the total. The internal zones that contain Northpark Mall, St. John's Regional Medical Center, Missouri Southern State University and Freeman Hospital West had the highest number of internal trips.
The No. 1 destination is the Northpark Mall/Missouri Southern area in northeast Joplin. The No. 2 destination is the medical district in southwest Joplin where St. John's and Freeman are located. Those destinations draw from across the region.
All of the Wal-Mart Supercenters in Joplin and Webb City are considered major destinations. The Supercenter in Webb City gets most of its business from east and north of the study area. The Supercenter at 15th Street and Range Line Road gets most of its draw from an area south of Joplin. The Supercenter on West Seventh Street draws customers from Galena and Riverton in Cherokee County, Kan.
Of the 136,138 local trips, 38,482, or 28 percent, originated or ended outside of Jasper and Newton counties in Missouri, Cherokee County in Kansas, and Ottawa County in Oklahoma. The city of Carthage recorded the highest number of local trips with 21,909. The city of Neosho recorded the second highest number of local trips with 11,250. The cities of Galena and Riverton in Kansas logged the third highest number of local trips with 7,660.
The study suggested that traffic increased by 102 percent on Newman Road on the east side of Joplin. That increase was attributed to the opening of Highway 249, also known as the Range Line bypass.
The study estimated that traffic decreased by 6 percent on Highway 66 on the west side of the town. That decrease was attributed to a decrease in population in Cherokee County.
David Hertzberg, director of public works for Joplin, said the study will be used over the next few years to help plan road construction projects in the Joplin area. The traffic study, in time, will show the traffic impact that new casino construction will have on the Joplin area.

More studies

David Hertzberg, Joplin public works director, said a copy of the report will be sent to the consulting firm that is doing a purpose-and-need study for the west bypass corridor study.

Highway finally ready

10/6/08
Print this story
Towns anticipate opening of corridor, Highway 249

By Wally Kennedy

wkennedy@joplinglobe.com

CARTERVILLE, Mo. - Carterville Mayor Dale Davenport's patience is about to pay off. The high-speed interchange for Missouri Highway 249, the Range Line bypass, is to open today, marking the completion of the $78 million project that began in 1993.

"Oh, yeah, we're ready for it," Davenport said. "I think it's going to open up all kinds of opportunities for business and manufacturing that we desperately need. We need the sales-tax revenue and the jobs.

"The people here will have to adjust. We're a small town, and that's what's neat about our town, but change is coming."

Davenport said it's only a matter of time before Carterville will flourish.

"Now, it's Carterville's time," he said. "The value of the property around the highway will go up, and we again will be a thriving community like it used to be. We want our town to grow and prosper. We used to be on top of a lead mine. Now, it's a gold mine."

Davenport and other mayors along the Highway 249 corridor know that someday Highway 249 will become Interstate 49, a four-lane, divided highway stretching from Baton Rouge, La., to Kansas City.

When Webb City Mayor John Biggs was asked how far away the town is from extending water and sewer services to Highway 249, he said: "It's $2 million away. We want to extend water and sewer along the 17th Street corridor. We're working on that."

Biggs echoed Davenport's belief that the economic potential for development is vast.

"That area will be great for manufacturing," he said. "You can ship product from there to anywhere in the United States. It's near the center of the country and two major arteries, Highway 71 and Interstate 44. There's lots of land and lots of people to work. We have a low cost of living, and low cost of water and sewer. We're in great shape to bring somebody in here who is involved in manufacturing or distribution."

Webb City will seek the construction of an interchange for East 17th Street.

The bypass, Biggs said, will make it much easier and convenient for Webb City residents to get "to all points south, including Newman Road, the college, and to 32nd Street and all the good restaurants."

Like Davenport, he said, "They built this high-speed interchange for one reason: to handle the traffic on what will be Interstate 49."

Bob Nichols, a resident of Webb City, said a grant from the U.S. Environmental Protection Agency paid for the creation of a development plan for the Highway 249 corridor. Noting the presence of lead and zinc mining sites along the 6.2-mile corridor, the plan suggests that the land be developed for industrial and commercial purposes. Residential construction, Nichols said, would be on the fringe of the corridor and away from the mining sites.

"But, we have no ability to implement the plan without zoning," he said. "There is really no control in the area."

Jasper County is the main player. Joplin, Duenweg, Webb City and Carterville can influence some of the development through their zoning regulations. A study completed in 2005 suggested that the area is sparsely populated, with only 1,360 residents, according to the 2000 census.

Development of the area will require a substantial investment in infrastructure for roads, utilities and water and sewer lines. The study estimated that construction eventually could cost $42 million. The study projected that an initial expenditure of $15 million would get things started near the main interchanges at Zora Street, Newman Road and East Seventh Street.

Duenweg was the first community to benefit from the first phase of Highway 249 construction more than a decade ago, said Duenweg Mayor Russell Olds.

"We have put two miles of water mains and sewer up and down it," he said. "For a city our size, we are getting steady commercial and residential development. We are growing our infrastructure."

So far, the city has spent $3 million on infrastructure installation.

"We have land available for continuous development," Olds said. "We had to brace ourselves for the changes or get run over. My plan is we never stop. We need one more high-speed at Carthage, and Interstate 49 in this area will be done."

Noting Duenweg's position with regard to Interstate 44 and what will become Interstate 49, he said, "We are the crossroads of the crossroads."

West bypass next?

CH2M Hill, a Kansas City engineering firm, was hired by the city of Joplin as a consultant to determine the potential future traffic demands for a west bypass that would link the west side of Joplin, near the Kansas border, to Highway 249, according to David Hertzberg, public works director for the city.

The next phase of the project would be to select the route for the bypass, which possibly could be built along what now is Route J/Central City Road. The current study is funded by federal tax dollars.

As part of the west bypass, an interchange would be built over North Main Street at Zora Street.

The city, working with the Missouri Department of Transportation, is completing preliminary plans for that project, which would include first-phase design of the interchange and buying property for it.

The interchange likely would span a Kansas City Southern railroad bridge and the creek that runs alongside North Main Street near the current Zora Street intersection.

THE JOPLIN GLOBE
It's your world. We deliver it.

Consultant: Traffic volume warrants West Bypass

January 15, 2009 09:33 pm

— By Debby Woodin
dwoodin@joplinglobe.com
Traffic accidents will increase on secondary roads west of Joplin and economic development will be stymied if a West Bypass is not built, a consultant told a panel of transportation planners Thursday in Joplin.
Rob Miller, an engineering consultant with CH2M Hill in St. Louis, outlined the needs and purposes for a major north-south corridor on the west side of Joplin for members of the Joplin Area Transportation Organization Policy Committee. The group is composed of city, county and state officials who plan and approve transportation projects.
Miller said the Downstream Casino Resort will pull more and more traffic across Joplin, and that there isn't an adequate route for motorists traveling from highways north of Joplin to the west or southwest side of the city. Current roads are insufficient for the amount of traffic they carry, and for efficient travel between Joplin, Carl Junction and Galena, Kan., Miller said.
He said the findings of his study suggest that the lack of a West Bypass causes overuse of local roads. Those roads are not designed for fast-moving traffic, and the traffic controls such as "yields" and "stops" cause some dangerous conditions that contribute to traffic accidents, he said. He said the roads have above average accident rates.
City and state planners are working to eventually build a major road called the West Bypass that will link up with Zora Street and North Main Street to carry traffic from highways 71, 43 and 249 to the west side of Joplin. Work to widen the intersection at 32nd and Main Streets in Joplin also was discussed.
Scott Bachman, district planning manager for the Missouri Department of Transportation's office in Joplin, said the state will open bids Feb. 20 on the construction work. He said construction has been delayed because it took longer than expected for environmental-impact studies and right-of-way acquisition to take place.
The city of Joplin will start about two weeks after the state's bid opening to contract work to finish widening 32nd Street from Jackson Avenue to Main Street, said Jack Schaller, Joplin's assistant public works director.
Bachman also announced that the state would contribute some money to a city project to build a viaduct over Connecticut Avenue, north of 26th Street, for a train overpass. The state and the city are waiting on environmental-impact studies to be completed to proceed with the project, the panel was told.
The Joplin City Council recently was told that bids will be solicited this spring for the construction work.
The planning group approved a project to build sidewalks in a two-block radius of Kelsey Norman Elementary School at 28th Street and Kansas Avenue. Sidewalks are needed because two children have been hit by cars while walking to school in the area, the group was told.
A plan to place cameras over portions of Interstate 44 also was approved. Bachman told the group that the state uses the cameras in metro areas to view accidents and incidents on interstate highways so that officials can determine more quickly what action needs to be taken and what types of emergency assistance are needed.
It has not yet been determined exactly where the cameras will be placed. The state will study where the most incidents have taken place on the stretch of I-44 within Joplin's city limits.

Camera costs

It will cost about $267,000 to install five or six cameras using fiber optics along Interstate 44 to scout traffic

1

accidents and incidents on the highway in the Joplin metro area, a state engineer said Thursday.

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4. JATSO Presentation – January 15, 2009

On January 15, 2009, a presentation was made to the board of the Joplin Area Transportation Study Organization (JATSO). The intent was to update them on the progress of the West Joplin Purpose and Need Study. This section contains the presentation, the meeting agenda, and the meeting sign-in sheet. A *Joplin Globe* article reporting on the meeting is contained in the press coverage portion of this appendix (**Appendix B.3**).

City of Joplin

AGENDA

JOPLIN AREA TRANSPORTATION STUDY ORGANIZATION
BASEMENT CONFERENCE ROOM
POLICY COMMITTEE
THURSDAY, JANUARY 15, 2009
1:30 P.M.

I. Meeting called to Order

II. Old Business

III. New Business

A. Presentation over the Joplin West Corridor Study – CH2M Hill

B. Safe & Sound Bridge Program - MoDOT

C. Update on the 32nd & Main Interchange Project - MoDOT

D. Update on the 25th & Connecticut Viaduct Project - MoDOT

E. Adoption of 2009-2012 TIP Amendments

a) Safe Routes to School Project (City of Carterville) – MoDOT (Vote will be needed)
b) Enhancement Project – MoDOT (Vote will be needed)
c) Transportation Project – MoDOT (Vote will be needed)
d) Administrative Amendment for the Joplin Airport – MoDOT (Vote will not be needed)

F. Functional Classification Review - MoDOT

G. Adoption of 2009-2012 UPWP Admendment

a) JATSO staff (Vote will be needed)

IV. Other Business

A. Update on the Website Development – JATSO Staff

B. Review on the Public Involvement Plan (PIP) - MoDOT

V. Adjournment

The meeting will be at Joplin City Hall in the Basement Conference Room, 602 Main Street, Joplin, Missouri.

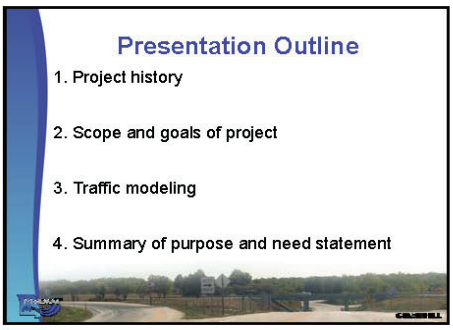
NOTE: **If you are in need of disability related auxiliary aids or services, contact our Joplin ADA Coordinator at 624-0820, Ext. 210, or the Joplin City Clerk's Office at 624-0820, Ext. 220. Kindly give us forty-eight (48) hours notice to arrange for the aids or services. TTD Number (417) 625-4774.**

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2 West Joplin Purpose and Need Study
MoDOT Job No. J7P0847

3

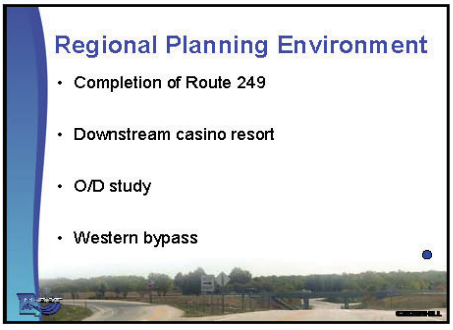












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West Joplin Purpose and Need Study
MoDOT Job No. J7P0847



Statewide Planning Environment

- I-44 Purpose and Need Study
- I-70 Supplemental Environment Impact Statement (EIS)

The Problems on I-44

1) Roadway capacity is becoming inadequate
2) There is a perception that safety is degrading
3) Interchanges along I-44 have deficiencies
4) Increases in freight are affecting operation
5) Inconsistencies with evolving design standards
6) Potential for positive and negative impacts to some of the state's most valuable resources

The I-70 Experience may be Illustrative

- First tier studies (1999 -2001) identified statewide need for reconstruction and additional capacity.
- Second tier studies to develop preferred alternatives concluded in 2006.
- Currently, the I-70 Supplemental EIS is investigating the impacts of truck-only lanes.
- Project web site: www.improvei70.org

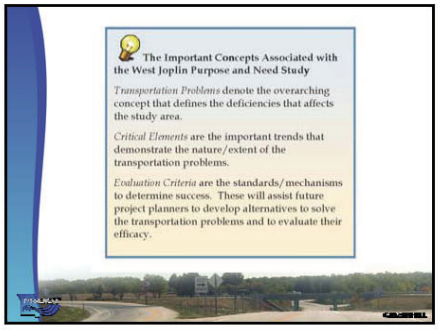
2. Scope and Goals of Project

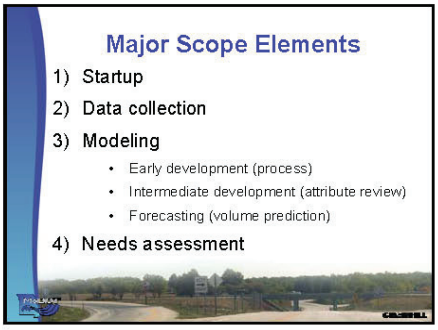
- What is a purpose and need study?
- Scope for this project and workflow

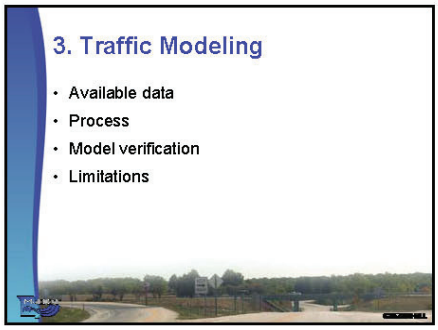
Elements of a Thorough Purpose and Need Statement

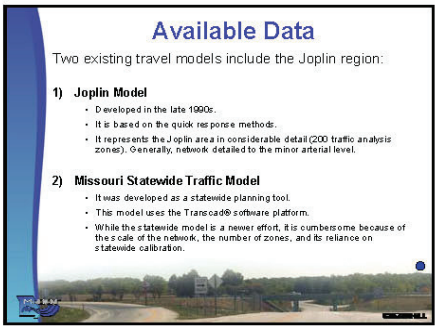
- According to MoDOT and FHWA, a thorough purpose and need will:
  - Identify and quantify the problem
  - Address logical termini
  - Not restrict other transportation improvements in the study area

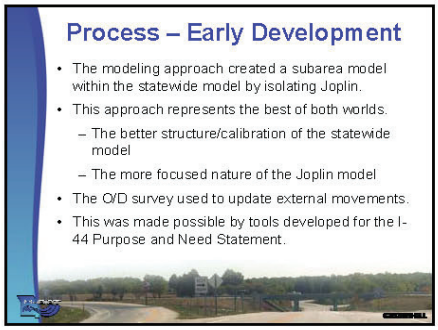
West Joplin Purpose and Need Study
MoDOT Job No. J7P0847













West Joplin Purpose and Need Study
MoDOT Job No. J7P0847

Process – Attribute Review

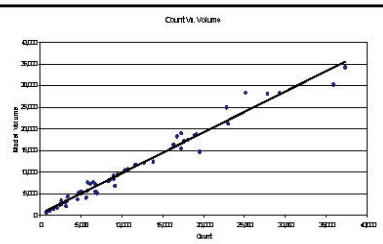
The project team reviewed and updated the model's primary inputs:

- Demographics
  - *Total population/households/automobiles/jobs*
- Roadway network
  - *Speeds/lanes/access control/turn lanes*
- Access connections
  - *Centroids and access pathways*

Verification

For the purposes of the West Joplin Purpose and Need Statement, the model was determined to be adequate. The verification report concludes:

"The majority of counts located within the greater Joplin area are closely represented by the output volumes from the model."



Limitations

While the modeling conducted for the West Joplin Purpose and Need Statement was determined to be adequate for its intended use, it needs to be recognized that not all locations meet all FHWA criteria. This can be readily explained by the relatively low counts at the collector level and the incomplete representation of local streets in the network.

4. Summary of Purpose and Need

- Transportations problems
- Critical elements
- Evaluation criteria

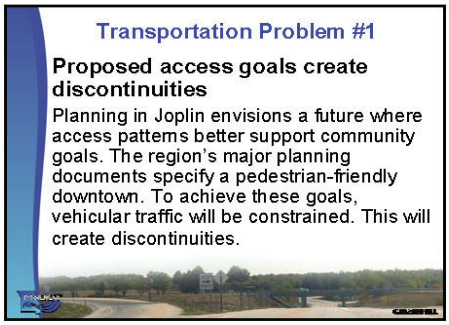
The Important Concepts Associated with the West Joplin Purpose and Need Study

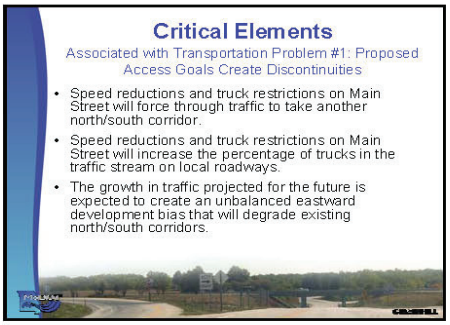
Transportation Problems denote the overarching concept that defines the deficiencies that affects the study area.

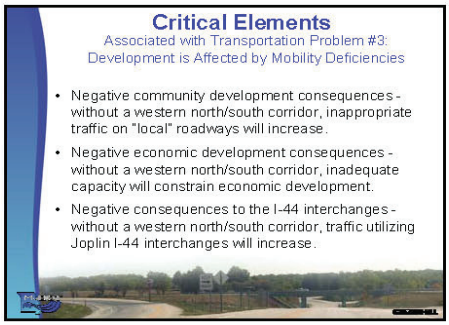
Critical Elements are the important trends that demonstrate the nature/extent of the transportation problems.

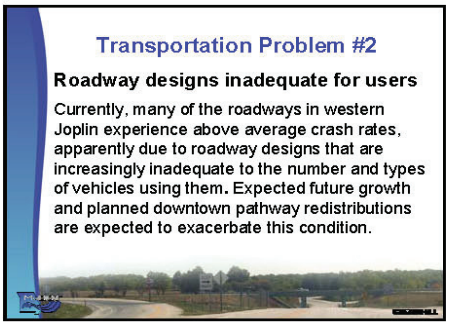
Evaluation Criteria are the standards/mechanisms to determine success. These will assist future project planners to develop alternatives to solve the transportation problems and to evaluate their efficacy.

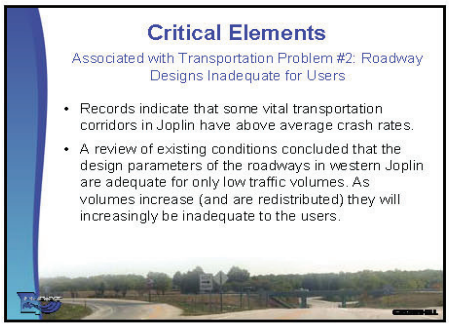
West Joplin Purpose and Need Study
MoDOT Job No. J7P0847

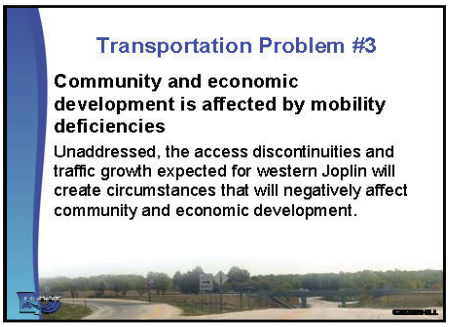






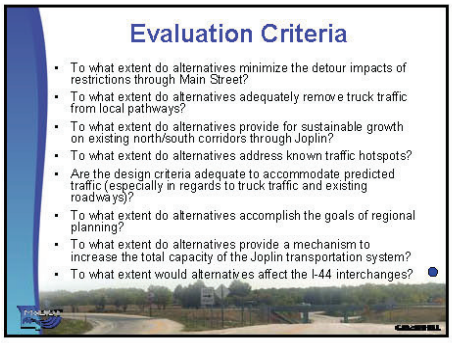






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West Joplin Purpose and Need Study
MoDOT Job No. J7P0847



6

Appendix C
Supporting Planning Documents

Appendix C: Supporting Planning Documents

This appendix contains supporting materials pertaining to planning elements of the project. The materials in this appendix include:

1. Draft design guidelines
2. Programmed and future projects (long-range transportation plan)
3. Environmental screening materials

1. Draft Design Guidelines

An important element to consider early in the purpose and need process is appropriate design guidelines for the project. The proposed design guidelines are outlined in **Table 1** and include design speed, intersection/interchange spacing, right-of-way width, and horizontal and vertical curvature limits. These guidelines were developed using the guidance for practical design and the latest accepted practices of MoDOT.

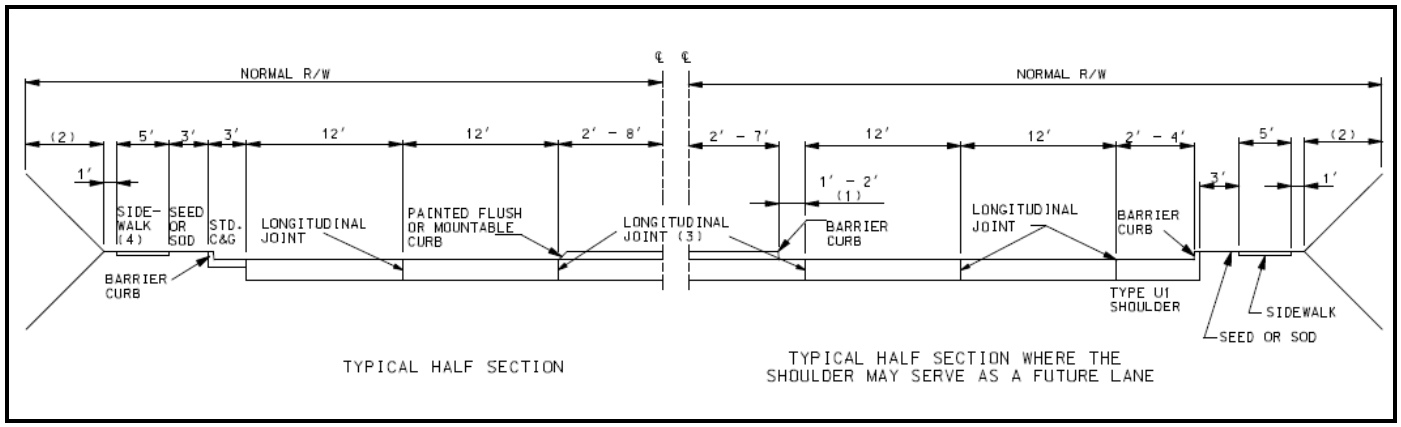
The expected project design year will be 2035.

MoDOT classifications for the typical sections are shown in **Figures 1 and 2**. It is anticipated that an expressway typical section will exceed the needs of the proposed corridor and that a collector typical section will not provide enough capacity. Should this assumption be incorrect, additional sections and criteria will be developed.

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FIGURE 1

Four-Lane Minor Urban Roadway

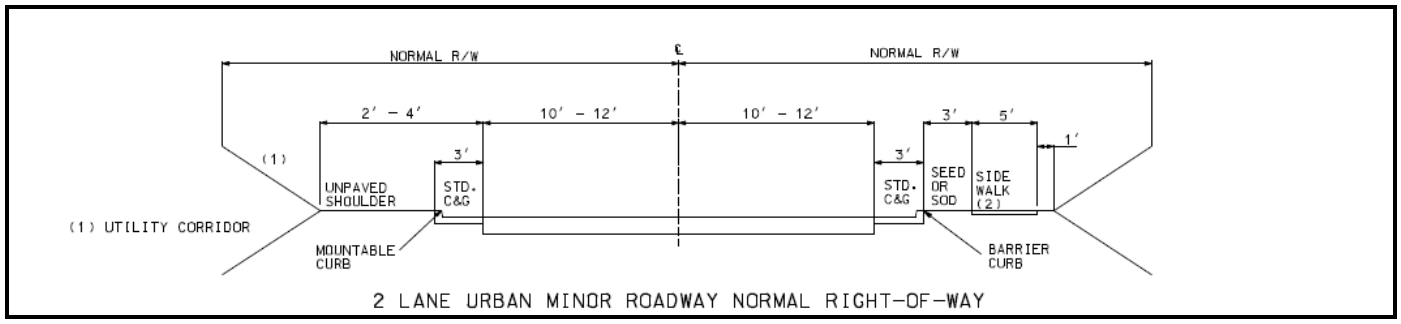


1) *1 foot offset required from continuous barrier median to edge of through lane; 2 foot offset required from intermittent barrier median to edge of through lane*
2) *Utility corridor*
3) *In one direction, the longitudinal joint at the median should be a Type M or L3 Joint. In the other direction, the longitudinal joint at the median should be a Type K or L2 Joint as shown on standard plan 502.05*
4) *Type A3 shoulders are to be used for both inside and outside shoulders. However, a Type A1 shoulder is used if a future lane is pending.*

2
3

FIGURE 2

Two-Lane Urban Minor Roadway



1) *Utility Corridor*
2) *Type A3 shoulders are to be used for both inside and outside shoulders. However, a Type A1 shoulder is used if a future lane is pending.*

4
5
6

TABLE 1

Joplin West Corridor – Proposed Design Criteria

DESIGN CONSIDERATION		
Functional Classification	Major Arterial	Minor Arterial
Traffic Service Volume (2030)	TBD	TBD
Number of Lanes (Basic)[1]	4 or 6 Lanes	2 or 4 Lanes
Anticipated Posted Speed [2]	50 mph	50 mph
Lane Width	12 feet	12 feet
Outside Shoulder Width	10 feet	8 feet
Safety Clear Zone[3]	22 feet	22 feet
Slopes (H:V):		
- Foreslope In Clear Zone - Foreslope Out of Clear Zone - Backslope	6:1 4:1 Des./3:1 Min. 3:1	6:1 4:1 Des./3:1 Min. 3:1
Maximum Horizontal degree of Curve[4] (superelevation)	6º 00 (R= 926 feet)	6º 00 (R= 926 feet)
Grade (Maximum)[5]	5 percent	5 percent
Crest Vertical Curve[6]	K = 84	K = 84
Sag Vertical Curve[7]	K = 96	K = 96
Passing Sight Distance[8]	1,835 feet	1,835 feet
Superelevation[9]	0.04 Feet/Foot	0.04 Feet/Foot
Pavement Cross Slope	2 percent	2 percent
Right-of-Way[10]	90 feet – 150 feet	90 feet – 120 feet
Intersection Spacing [11]	Minimum - 1/2 mile (2,640 feet)	Minimum - 1/8 mile (660 feet)
	Maximum - 1 mile (5,280 feet)	Maximum - 1/4 mile (1,320 feet)
JATSO Functional Classification Descriptions from the Comprehensive Plan	The main function of an arterial street is to move large volumes of traffic from one place to another at a high speed, provide continuous linkages between major traffic generators, and serve as a transition roadway between major collector streets and expressways. Planned access is its secondary function. An arterial should be planned to have no residential lots fronting on it. Nonresidential uses may access an arterial street through a frontage road or strictly controlled entrance.	
Ditch Depth (Desirable) [12]	Sufficient to remove surface water without saturation of the subbase-including the pavement base.	

Notes:
1. Lanes depend on design year traffic forecasts.
2. MoDOT EPG section 230.1.1- Highways are designed according to their anticipated posted speed.
3. Refer to AASHTO "Roadside Design Guide"
4. Exhibit 3-15 – 2004 Policy on Geometric Design – AASHTO.
5. MoDOT EPG section 230.2.1. Reference AASHTO Exhibit 7-2 for rural arterials – 2004 Policy on Geometric Design
6. Exhibit 3-72 – 2004 Policy on Geometric Design - AASHTO
7. Exhibit 3-75 – 2004 Policy on Geometric Design - AASHTO
8. Exhibit 3-7 – 2004 Policy on Geometric Design - AASHTO
9. If superelevation is used on crossroad in Urban Area, use 0.04 '/' as maximum superelevation.
10. CATSO 2025 Roadway Plan
11. MoDOT EPG 940.5 - At Grade Intersection Spacing
12. Guidance from MoDOT EPG Section 231.6.1.1

2. Programmed and Future Projects (Long-Range Transportation Plan)

The Joplin Metropolitan Area Long-range Transportation Plan (LRTP) serves as the “blueprint” for the Joplin metropolitan area’s transportation system through the year 2025. Urban areas are required by the Federal Highway Administration (FHWA) to have a Metropolitan Planning Organization (MPO) to coordinate long-range transportation planning. JATSO is the designated MPO for Joplin and the LRTP represents its central organizing document.

The modeling of future conditions was based on the programmed projects and the long-range projects listed in the Joplin Metropolitan Area LRTP. Programmed projects are often referred to as committed projects. They are projects that are to be constructed in the near-term; generally included on the transportation improvement program (TIP) or included in other dedicated funding mechanisms. Long-range projects can include future projects that have funding sources that may be defined or undefined. The traffic model created for this project (see **Appendix D)** utilizes the programmed projects and long-range projects as the basis for predicting future traffic conditions.

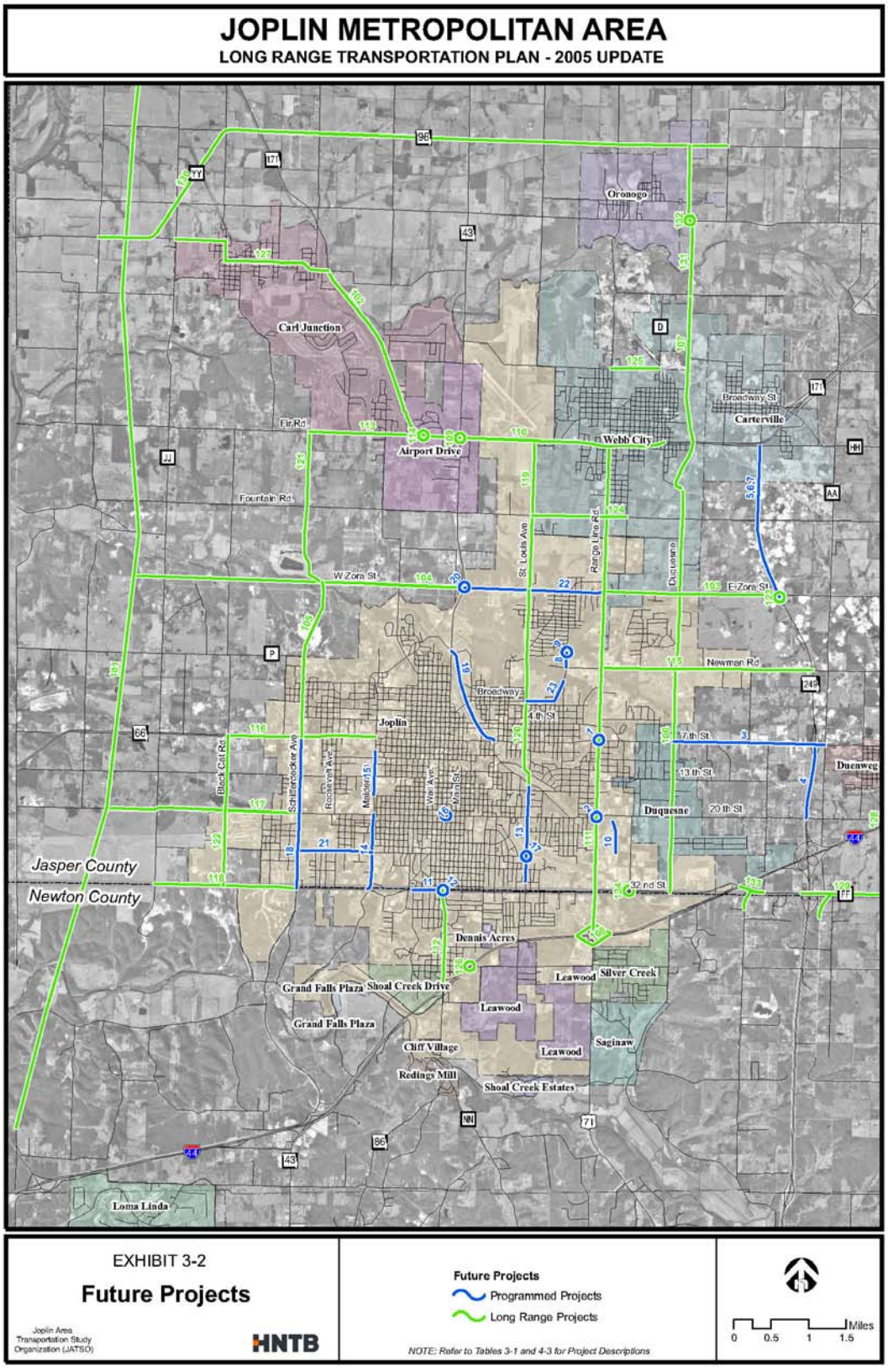

JOPLIN METROPOLITAN AREA
LONG RANGE TRANSPORTATION PLAN - 2005 UPDATE
Oronogo
Carl Junction
Webb City
Carterville
Airport Drive
Fir Rd
Fountain Rd
W Zora St
E Zora St
St Louis Ave
Range Line Rd
Ducusane
Broadway St
Newman Rd
Broadway
4th St
Joplin
7th St
13th St
20th St
Duquesne
Duenweg
Black Cat Rd
Schifferdecker Ave
Roosevelt Ave
Madison
Wall Ave
Main St
Jasper County
Newton County
32nd St
Dennis Acres
Grand Falls Plaza
Shoal Creek Drive
Leawood
Silver Creek
Saginaw
Cliff Village
Redings Mill
Shoal Creek Estates
Loma Linda
EXHIBIT 3-2
Future Projects
Joplin Area Transportation Study Organization (JATSO)
HNTB
Future Projects
Programmed Projects
Long Range Projects
NOTE: Refer to Tables 3-1 and 4-3 for Project Descriptions
Miles
0 0.5 1 1.5

TABLE 4-2 ESTIMATED AVAILABLE FUNDING, STREET AND HIGHWAY PROJECTS, 2006-2025

Funding Source	Amount
Federal	$130,493,867
State	$33,753,600
Local	$133,161,333
Total	**$359,566,660**

A list of long range street and highway projects and estimated costs are presented in ***Table 4-3***. The current programmed street and highway projects were discussed in Section 3 and are listed in Table 3-1. The cost estimates provided in this LRTP are very general in nature and will need to be refined during project development. The estimated costs were used to compare with anticipated revenues.

TABLE 4-3 LONG RANGE PROJECTS

No.	Route	From	To	Length (Mi.)	Funding	Description	Cost
101	West Bypass	171	I-44	16.0	Unfunded	New highway construction with limited access	$150,000,000
102	171	Pennel	43	3.1	State/Fed	Widen road (2 to 4)	$9,820,800
103	Zora	Range Line	249	2.4	Local/STP	Improve and widen (2 to 4)	$7,603,200
104	Zora	West Bypass	Main	4.4	Local/STP	Improve and widen (2 to 4)	$13,939,200
105	Schifferdecker	66	Zora	2.1	Local/STP	Widen road (2 to 4)	$6,720,000
106	Duquesne	32nd	N 17th	2.1	Unfunded	Widen/reconstruct road (2 to 4/5)	$7,207,200
107	Hall	N 17th	Hawthorn	5.4	Unfunded	New roadway construction	$22,809,600
108	Range Line	Interchange w/ I-44	-	2.7	State/Fed	Reconstruct interchange	$15,000,000
109	43	Intersection w/ 171		1.0	State/Fed	Access management and intersection improvements	$2,000,000
110	171	Hall	Main	0.4	State/Fed	Access management and intersection improvements	$400,000
111	Range Line	171	I-44	2.7	State/Fed	Access management, signal coordination and intersection improvements	$2,700,000
112	43/86	32nd	I-44	6.5	State/Fed	Access management, turn lanes and intersection improvements	$15,444,000
113	Fir	Peace Church	171	1.3	Local/STP	Reconstruction and addition of turning lane	$2,402,400
114	Fir	Intersection w/ 171	-	1.5	Local/STP	Intersection improvement	$1,500,000
115	Newman	Range Line	249	0.4	Local/STP	Reconstruction and addition of turning lane	$739,200
116	7th	Maiden	Black Cat	2.8	Local/STP	Add turn lanes	$5,174,400
117	20th	West Bypass	Schifferdecker	2.0	Local/STP	Reconstruction and addition of turning lanes	$3,696,000
118	32nd	JJ	Schifferdecker	2.6	Local/STP	Minor roadway widening	$4,804,800
119	St. Louis	Zora	171	1.9	Local/STP	Minor roadway widening and addition of turning lanes	$3,511,200
120	St. Louis	Murphy	Broadway	2.0	Local/STP	Minor roadway widening and addition of turning lanes	$3,696,000
121	Peace Church	Zora	Fir	2.6	Local/STP	Roadway improvement	$3,432,000
122	Black Cat	Newton	66	2.1	Local/STP	Widen to 3 lanes	$3,880,800
123	Zora	Int w/ Main	-	2.0	10 Year Tax; Unfunded	Purchase right-of-way and construction for interchange	$15,050,000
124	17th	Oronogo	e/o Prairie Flower	1.3	Local/STP/unfunded	New roadway construction	$4,656,960
125	Carl Junction Rd.	Madison	Rt D	0.3	Local/STP	New roadway construction	$1,108,800
126	44th	Overpass at I-44	-	0.6	State/Fed	New overpass construction	$5,000,000
127	Route Z (Pennel)	YY	Rt 171	0.4	Unfunded	Reconstruct/widen (2 to 3)	$739,200
128	CR190	Interchage with I-44		2.3	Unfunded	Interchange	$15,000,000
129	FF	US-71	CR 190	1.0	Unfunded	Reconstruct/widen (2 to 3)	$1,848,000
130	Route 96	JJ	D	9.1	Unfunded	Access Management	$2,000,000
131	Route D	Hawthorne Rd.	Rt 96	2.0	Unfunded	Reconstruct/new bridge	$3,000,000
132	Route D	E Ivy Road		0.4	Unfunded	Intersection Improvement	$500,000
133	Route FF	Reinmiller		0.4	Unfunded	Intersection Improvement	$500,000
134	32nd	Davis		0.6	Unfunded	Intersection Improvement	$500,000
						Total	**$335,383,760**

West Joplin Purpose and Need Statement
MoDOT Job No. J7P0847
Appendix C-7

TABLE 3-1 PROGRAMMED PROJECTS

No.	Route	From	To	Length (Mi.)	Funding	Description	Cost
1	BU 71/ Range Line	Intersection w/ Rt. 66/ 7th	-	0.4	Safety, STP-Enhancement	Add turn lanes and revise geometrics and signals	$1,836,000
2	BU 71/ Range Line	Intersection w/ 20th St.	-	0.2	Safety, STP-Enhancement	Add turn lanes and revise geometrics and signals	$3,453,000
3	66	Duquesne Rd.	Rt. 249	1.6	STP, STP-Enhancement	Right-of-way acquisition and upgrade to four lanes	$105,000
4	249	Rt. 66	20th St.	1.0	STP, MoDOT	Grading, paving and bridges to add lanes for dual divided high	$4,567,000
5	249	Rt. 171	Zora St	2.4	NHS, MoDOT	Grading and drainage for two lanes	$17,516,000
6	249	Rt. 171	Zora St	1.0	NHS, MoDOT	Grading, drainage, paving and interchange lighting	$8,816,000
7	249	Rt. 171	Zora St	2.4	NHS, MoDOT	Construction of bridges for two lanes	$16,994,000
8	Florida	Newman	Turkey Creek	0.25	Joplin Transporation Tax	Widening street to 3 lanes	$200,000
9	Florida	Bridge over Turkey Creek	-	-	Joplin Transporation Tax	Bridge construction	$1,000,000
10	Geneva	700'	2600' south of 20th	0.25	Joplin Transporation Tax	Purchase right-of-way and construction for Geneva extension	$1,200,000
11	32nd	Main	Jackson	0.5	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction	$2,687,500
12	32nd	Intersection w/ Main	-	-	50% 10 Year Tax; 50% MoDOT matching	Intersection Improvement	$4,300,000
13	Connecticut	Murphy	30th	1.4	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction	$6,450,000
14	Maiden	20th	32nd	1.0	Joplin Transportation 10 Year Tax		$2,150,000
15	Maiden	9th	17th	0.6	Joplin Transportation 10 Year Tax		$2,150,000
16	20th	Intersection w/ Main	-	-	Joplin Transportation 10 Year Tax	Intersection Improvement	$1,505,000
17	Connecticut	Viaduct at 26th	-	-	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction of overpass	$4,300,000
18	Schifferdecker	7th	32nd	2.0	Joplin Transportation 10 Year Tax		$2,687,500
19	Murphy	Main	7th	1.8	Joplin Transportation 10 Year Tax		$1,671,625
20	Zora	Intersection w/ Main	-	-	20% 10 Year Tax; 80% Federal Funds	Purchase right-of-way and construction for interchange	$15,050,000
21	26th	Maiden	Schifferdecker	1.0	Joplin Transportation 10 Year Tax		$1,881,250
22	Zora	Range Line	Main	2.0	Joplin Transportation 10 Year Tax	Purchase right-of-way and construction for street widening	$2,150,000
23	Broadway/Buchanan	Florida	St. Louis	0.7	Joplin Transportation 10 Year Tax		$1,290,000
24	St. Louis	Broadway	Zora	1.5	Joplin Transportation 10 Year Tax		$1,827,500
25	CR190	32nd	I-44	-	Joplin Transportation 10 Year Tax		$2,150,000
						Total	$107,937,375

The primary purpose of performing forecasts of future traffic is to be able to identify where breakdowns or capacity problems in the transportation system will occur or worsen. While one can look at individual segments that are anticipated to be congested, perhaps the more appropriate action is to look at the anticipated condition of an overall travel corridor. The location where traffic volumes would approach or exceed capacity for the Year 2025 E+C network is shown in ***Exhibit 3-1***. The locations identified where future traffic congestion is anticipated include:

- Range Line Road – Many sections of Range Line Road are projected to approach vehicle capacity in the year 2025, even with the opening of Route 249. Traffic growth is anticipated to be highest south of 7th Street to the interchange of I-44.
- Route 171 – The section of Route 171 between Pennel Street in Carl Junction and M-43 (Main Street) in the City of Airport Drive is predicted to be congested.

3. Environmental Screening Materials

Lawrence L Ayres/SC/MODOT
06/13/2008 01:13 PM

To Jerry P Davis/D7/MODOT@MODOT
cc Toni M Prawl/SC/MODOT@MODOT, Randall D Dawdy/SC/MODOT@MODOT, Carolyn M Brockes/SC/MODOT@MODOT, Timothy.Redmond@modot.mo.gov@MODOT, Jane.Lee@modot.mo.gov@MODOT, Michael.Meinkoth@modot.mo.gov
Subject RES response for: Jasper Newton xyz, J7P0847

District: **07**
County: **Jasper/Newton**
Route: **xyz**
Job No: **J7P0847**

Date of Request: 5/16/08
Date of Response: 6/13/08

Type of Project/Improvements: Purpose and Needs study

Right of Way and/or Easements needed: n/a

Cultural Resources Impacts:
We have reviewed the extant literature to identify potential cultural concerns within the study area. While there is not a tremendous amount of information about the study area, we have identified a variety of resources that should be considered as the study continues. These include old towns and communities that have existed, railroads, mines, cemeteries, Route 66, and some specific locations that may be of interest culturally. Only one archaeological site was identified that has been assessed as eligible (others certainly may be significant but additional investigations would be necessary to document that significance). Fourteen buildings or districts have been listed on the National Register of Historic Places (three additional ones have been determined as eligible for listing) but all of these are within Joplin. Unless an alternate is considered that would impact downtown Joplin, there will be little chance for this project to impact any of these resources.

Any alignments considered for this project will have some impact on cultural resources due to the location. Two larger streams (Shoal Creek and Turkey Creek) cross the entire study area from east to west. Both of these streams would have a high probability for archaeological resources. Linear resources such as US Route 66 and numerous early railroad grades will also be crossed. Other architectural resources (as well as archaeological resources) should be expected as the study moves forward. No bridges currently known to be historic were identified within the study area.

The two attached files provide a map and a list of most of the known cultural resources that may affect the placement of proposed alternatives.

Please let us know if additional information is needed.

Thanks
Larry Ayres
MoDOT Senior Historic Preservation Specialist
Lawrence.Ayres@modot.mo.gov
Ph. 573-526-7836 Fax. 573-526-1300

RES DATA SHEET

PROJECT STAGE:	**Initial Screening**		**DUE DATE:**	**6/20/2008**
CORE TEAM MEMBER(S):			**Letting Date:**	**No date scheduled at this time.**
JOB NO:	**XWALK:**	**COUNTY:**	**ROUTE:**	**LOCATION:**
7P0847	7P84701P	**Jasper/Newton**	**xyz**	on west side of Joplin metropolitan area.
NEPA CLASSIFICATION:	**NEPA will be evaluated at the Loc/Concp stage of the project when more ROW information is available**			
PROJECT DESCRIPTION:	Study for need of a possible improved roadway in north/south connection west of Joplin, MO			

ADD ROW:	**TEMP EASEMENT AC:**	**PERM EASEMENT AC:**
Unknown at this time.	Unknown at this time.	Unknown at this time.

DISPLACEMENTS:
Residential -
Commercial -

DISTRICT COMMENTS:

Environmental Screening and Possible Env. Or District Action

Threatened & Endangered Species This is such a broad corridor that it is difficult to review. However, there are rare mussels and fish in Shoal Creek, Center Creek, Turkey Creek, and the Spring River. There are also numerous caves within the limits defined on the RES. Finally, there are several unique natural communities identified in the area. Some of these communities may no longer exist. Field verification of all of these species and communities will be necessary. The biggest threatened and endangered species concern is with the sensitive species in the waterways.

Environmental Action: Conduct surveys once the corridor has been narrowed down.

District Action: Further define the corridor.

Hazardous Waste Impact WJW 6/13/08 Until ROW limits are determined, it is impossible to predict the impacts, however, the study area is within the limits of the Tri-State Lead / Zinc District National Priorities List Superfund Site. This region has a high occurrence of lead mines, smelters, haul roads, mine waste, mine shafts etc., and elevated lead levels and other heavy metals are frequently encountered.

Environmental Action: None until ROW limits are known.

District Action: If a hazardous waste site is encountered during the project, contact Bill Wilder, Hazardous Waste Specialist at (573) 526-2904.

Wetland Impact Possibly, wetland impacts could be associated with Shoal Creek and or Center Creek. It is likely that stream impacts could occur anywhere within the study area.

Environmental Action: Evaluate preferred alignment for impacts and obtain Section 404 permit.

District Action: Notify Wetland Specialist when preferred alternate is chosen and provide preliminary plans.

Cultural Resources Impact	We have reviewed the extant literature to identify potential cultural concerns within the study area. While there is not a tremendous amount of information about the study area, we have identified a variety of resources that should be considered as the study continues. These include old towns and communities that have existed, railroads, mines, cemeteries, Route 66, and some specific locations that may be of interest culturally. Only one archaeological site was identified that has been assessed as eligible (others certainly may be significant but additional investigations would be necessary to document that significance). Fourteen buildings or districts have been listed on the National Register of Historic Places (three additional ones have been determined as eligible for listing) but all of these are within Joplin. Unless an alternate is considered that would impact downtown Joplin, there will be little chance for this project to impact any of these resources. Any alignments considered for this project will have some impact on cultural resources due to the location. Two larger streams (Shoal Creek and Turkey Creek) cross the entire study area from east to west. Both of these streams would have a high probability for archaeological resources. Linear resources such as US Route 66 and numerous early railroad grades will also be crossed. Other architectural resources (as well as archaeological resources) should be expected as the study moves forward. No bridges currently known to be historic were identified within the study area.
Historic Preservation Action:	
District Action:	
Air & Noise Impact	After considering the work that will be needed on current environmental documents and the general reduction in future work, Kathy Harvey has determined that Design will no longer have an air and noise quality specialist. **There will be times when you need help with evaluating the noise sections of environmental documents and you will work with an on-call consultant.** For air quality question please refer to Eric Curtit in the Planning Division.
District Action:	**The District is responsible for complying with all Air and Noise environmental requirements.**

NOTE: Please inform us if the nature or scope of this project changes.

Cultural Resources that should be considered within the study area marked on the RES map

General

Mining (structural remains)
Railroads (historic lines)
Route 66
Cemeteries

Specific

Grand Falls (provided electrical power and water to Joplin in 1890s; Grand Falls Park completed in 1903; dam just above falls completed 1920s)

WPA Marker: A tri-state WPA marker erected during the Depression era marks the point where the Missouri, Kansas, and Oklahoma state borders meet. In correspondence from 1994, SHPO staff stated that if the marker retains integrity, it probably is eligible for the NRHP. No photos or maps further identifying the marker were found in the files; however, its location was described as about 100 yards from I-44 and not visible from the highway. Its existence/location has not been verified.

Ku Klux Klan Cave: large cave used by the KKK from ca. 1900-1940

Peace Church Cemetery: Cemetery founded in 1856 that was also used to bury Bill Cook, executed in the 1950's for the murder of 5 members of a family in Joplin. However, report by Time magazine (10/29/1952) states he was buried in Lone Elm, Kansas, approx. 100 miles northwest of Joplin.

Archaeological Sites: Only one known archaeological site was specifically identified as eligible for the NRHP. Numerous others have been recommended as eligible but would require additional investigations to determine their eligibility.

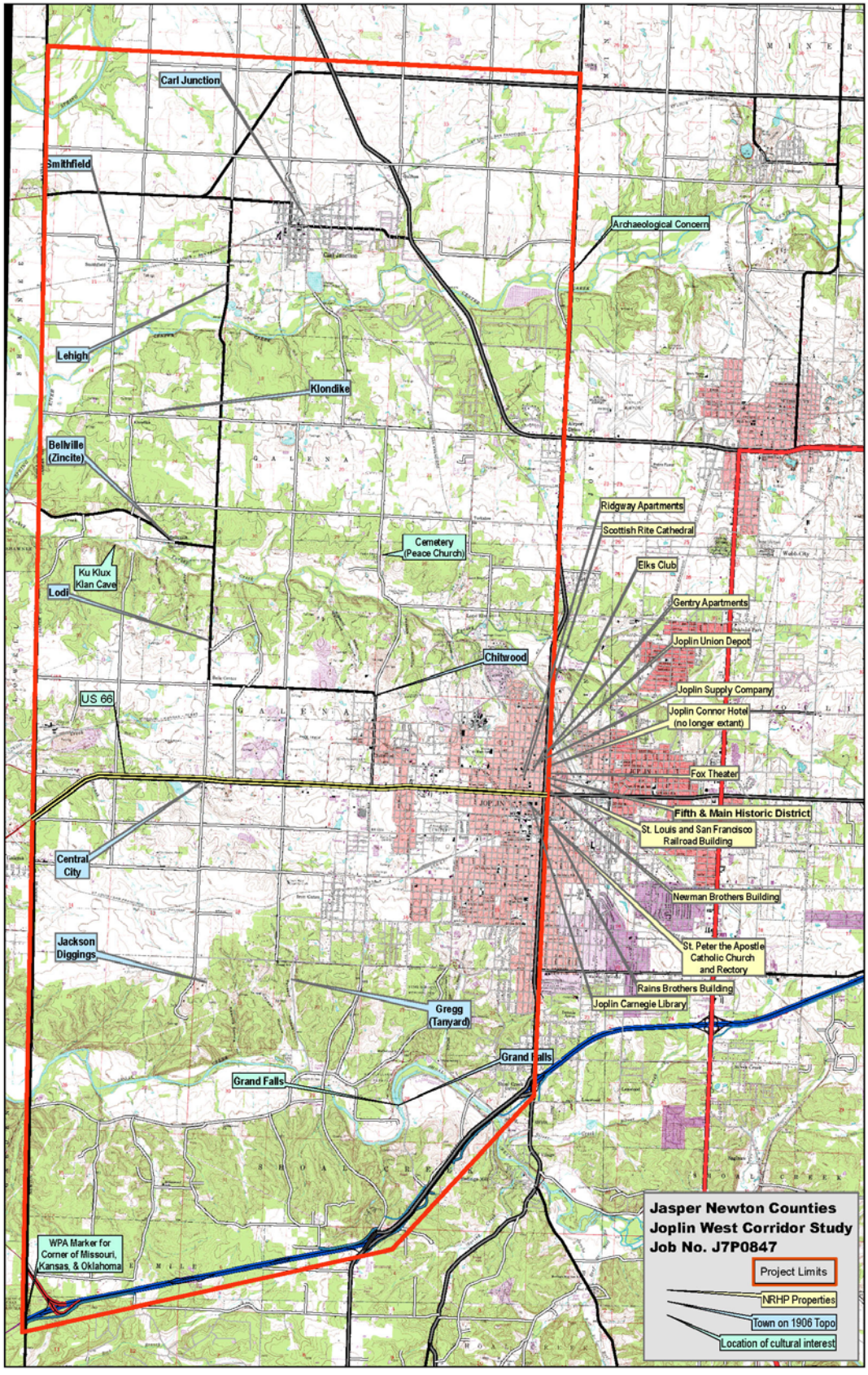
Architectural Resources: Three additional buildings have been determined eligible for the NRHP but as with the list below, all are located within Joplin. Unless an alignment was considered that went through the developed portions of Joplin, none of these would require further study.

NRHP: Buildings listed on the National Register of Historic Places

Elks Club Lodge #501, 318--320 W. 4th St., Joplin
Fifth and Main Historic District, 501-513 S. Main St., 502-508 Virginia St., Joplin
Fox Theater, 415 S. Main St., Joplin
Gentry Apartments, 318 S. Wall St., Joplin
Joplin Carnegie Library, 9th and Wall Sts., Joplin
Joplin Connor Hotel, 324 Main St., Joplin (No Longer Extant)
Joplin Supply Co. 228 S. Joplin Ave., Joplin
Joplin Union Depot, Broadway and Main St., Joplin
Newman Brothers Building, 602--608 S. Main St., Joplin
Rains Brothers Building, 906--908 S. Main St., Joplin
Ridgway Apartments, 402 and 404 S. Byers Ave., Joplin
Scottish Rite Cathedral, 505 Byers Ave., Joplin
St. Louis and San Francisco Railroad Building, 605 Main St., Joplin
St. Peter the Apostle Catholic Church and Rectory, 812 Pearl St., Joplin

Towns (Based on towns identified on 1906 topo)

Bellville (Zincite)	Cave Springs	Chitwood
Jackson Diggins	Klondike	Lodi
Carl Junction	Central City (Cagle)	Greg (Tanyard)
Joplin	Lehigh	Smithfield


Carl Junction
Smithfield
Archaeological Concern
Lehigh
Klondike
Bellville (Zincite)
Ridgway Apartments
Scottish Rite Cathedral
Cemetery (Peace Church)
Elks Club
Ku Klux Klan Cave
Lodi
Gentry Apartments
Joplin Union Depot
Chitwood
US 66
Joplin Supply Company
Joplin Connor Hotel (no longer extant)
Fox Theater
Fifth & Main Historic District
St. Louis and San Francisco Railroad Building
Central City
Newman Brothers Building
St. Peter the Apostle Catholic Church and Rectory
Jackson Diggings
Rains Brothers Building
Joplin Carnegie Library
Gregg (Tanyard)
Grand Falls
Grand Falls
WPA Marker for Corner of Missouri, Kansas, & Oklahoma
Jasper Newton Counties
Joplin West Corridor Study
Job No. J7P0847
Project Limits
NRHP Properties
Town on 1906 Topo
Location of cultural interest

1

Appendix D
Traffic Supporting Documents

Appendix D: Traffic Supporting Documents

This appendix contains supporting materials pertaining to the traffic modeling conducted for the West Joplin Purpose and Need Statement. The materials in this appendix include:

1) Summary of existing traffic models
2) Evaluation of potential traffic modeling approaches
3) Summary of traffic modeling process
4) Project team review – demographics
5) Project team review – roadway network
6) Project team review – access connections
7) Verification report

1. Summary of Existing Traffic Models

There are two usable travel models which include the Joplin region.

The first model is the Joplin model developed in the late 1990s. It is based on the quick response methods (documented in NCHRP 185/365) and implemented using QRS II® software. For this project, model roadway networks developed for this model have already been converted from QRS II® to TransCAD® format. This represents the Joplin area in detail and is comprised of (including external cordon stations) about 200 traffic analysis zones (TAZs). Generally, networks are detailed to the minor arterial level and also represent significant collector facilities. Recently, a series of traffic counts, as well as, a cordon intercept study was conducted as an input to updating the model. This study (the 2007 Regional Origin and Destination Survey - O/D Survey) provides considerable detail regarding travel movements into and out of the Joplin area, as well as, trips through the area. No information on local internal trip-making was collected.

The second model is the more recently developed statewide traffic model (MOSM), developed as a statewide planning tool with a network and zone system representing the entire state of Missouri. This model executes on the TransCAD® software platform and includes both a process and data management interface to simplify model execution for the user. The statewide model represents a newer effort and one that the project team is readily familiar with. The problems are 1) it is a cumbersome option because of the scale of the network and number of zones; 2) it may be less sensitive to travel behavior associated with the Joplin region because the model is based on a statewide calibration; 3) ways to make use of the cordon intercept data recently collected need to be developed.

2. Evaluation of Potential Traffic Modeling Approaches

This section summarizes the evaluation of potential traffic modeling approaches for the West Joplin Purpose and Need Statement. This section also discusses the options considered, potential advantages, and drawbacks of each modeling approach.

In evaluating potential traffic modeling approaches the major considerations were:

- Adequacy of area network and zone representation
- Validity and robustness of models and overall representation of travel
- Ability to update and expand models based on potential new “edge” development and other changed parameters
- Quality and workability of user platform and interface for staff to execute necessary model runs and evaluation
- Compatibility with available off-the-shelf tools and procedures which could be useful in project analysis

- Quality, completeness, and readability of associated model documentation to assure correct model implementation

Evaluation of the Joplin Model

The Joplin model is usable for planning level predictions, but some information about assumptions in the model is still needed. There is very little internal documentation of the process structure in the QRS II® software. It appears the original model was developed by HNTB, but there is no supporting documentation. Various tables and datasets are available but are ambiguous as to what categories and modeling process was used. Apparently, the process was customized to specifically support the modeling in Joplin, but currently there is no documentation of what changes were made. Also, the age of the model raises questions regarding the validity of any calibration parameters.

The existing network has been converted to TransCAD® and the geography standardized to latitude/longitude. This allows direct comparison and linking with the statewide model and will provide integration with GIS. The Joplin network appears to be more detailed than the statewide model, although additional zone and network detail could be added to the statewide model.

The O/D Survey seems to have been generated through and internal-external trip tables for auto and commercial trips. The zone system applied in the survey appears to be the same one as the model (although numbering schemes are different). The following information is needed to apply this new data to the Joplin model: 1) trip purposes and vehicle class assumptions in the model; 2) updated trip generation data for the internal zones, and 3) instructions on how to apply the Joplin trip distribution model. This will give us a revised internal-internal distribution that when married with the O/D Survey tables will comprise all area trip making. This can be accomplished by converting the O/D Survey to triptables independently or get a machine readable (spreadsheet version) of the data. Forecasting procedures for the external station triptables will need to be created.

Evaluation of the Statewide Model (MOSM)

The statewide model represents a familiar and newer effort. The problems are: 1) the scale of the network and number of zones make this a very cumbersome option; 2) it is less sensitive to travel behavior associated with the Joplin region because the model is based on a statewide calibration; 3) it may be possible to use the cordon intercept data to improve the model recently collected.

3. Summary of Traffic Modeling Process

The proposed traffic modeling approach is to create a subarea model with the statewide model by isolating Joplin. This will require the use of the cordon intercept data to update the external movements. This approach will allow application of the statewide model framework to the Joplin subarea without substantive changes. It will also allow use of tools previously developed for the I-44 project and other TransCAD® based efforts.

This represents the best of both worlds because the better model structure/calibration of the statewide model is captured while retaining the focused nature of the city model. As an application framework, this approach may be something that would be of continuing interest to MoDOT as a way to capture their investment in the statewide model and demonstrate that it can be a platform for a greater variety of subarea and project modeling. From the local perspective,

this could potentially yield a useful tool for regional and subregional efforts. The schedule for the modeling effort had three phases:

1) Early Development Phase

- Buildup area model by adding links to highway network, adding zones in Joplin, and isolating Joplin as an independent modeling study area (moating)
- Allocate the statewide model zone quantities to the Joplin subzone zone system for review by the project team
- Output GIS plots of network assumptions from Joplin model for review by the project team
- Complete early development phase

2) Project Team Review and Intermediate Development Phase

- Build network and zone database and input new Joplin focus-area model during the 3-week review period
- Complete “moating” around Joplin by breaking all links entering or leaving the area
- Develop external station projection method (either by growing survey data or by reallocating survey data using cordon growth)
- Conduct the project team meeting to update network assumptions from step 1

3) Final Compilation and Forecasting

- Input future network and land use assumptions for future conditions
- Run model and review output results
- Troubleshoot as needed
- Complete forecasting

4. Project Team Review - Demographics

This section summarizes the review process conducted for demographic data associated with the traffic modeling process utilized for the West Joplin Purpose and Need Statement.

As summarized above, the proposed traffic modeling approach is to create a subarea model with the statewide model by isolating Joplin. This approach would allow application of the statewide model framework to the Joplin subarea without substantive changes. It would also allow use of tools previously developed for the I-44 project and other TransCAD® based efforts.

The first step of this process (the early development phase) involved the creation of a buildup area model by adding links to highway network, adding zones in Joplin, and isolating Joplin as an independent modeling study area. The statewide model zone quantities were allocated to the Joplin subzone zone system.

In order to have the best results, the preliminary data was offered to the project team for their review and consideration. The key demographic parameters are:

- Total population
- Number of households
- Number of automobiles
- Number of jobs broken into one of seven categories (retail, office, education, healthcare, manufacturing, entertainment, and other)

The project area has been subdivided into the 161 traffic area zones (TAZs) used in the original Joplin traffic model. These areas were also utilized by and referenced in the recently completed O/D Survey. The TAZ map is contained in **Appendix A**.

The form of the demographic data model is summarized in **Table 1 and 2**. For reference, TAZ 32 is a small zone west of downtown, along Route 66. It contains the West 7th Street Wal-Mart. **Table 1** depicts the data contained in the model at the start of the project (year 2000). The relevant tasks were to update this data so that it was suitable to be considered representative of existing conditions.

TABLE 1

TAZ: 32 (existing)									
			Jobs						
Population	Households	Automobiles	Retail	Office	Education	Healthcare	Manufacturing	Entertainment	Other
298	118	168	66	19	8	10	40	1	19

Table 2 depicts the data contained in the model at the start of the project (year 2035). The relevant task was to update this data so that it was suitable to be considered representative of existing conditions in 2035.

TABLE 2

TAZ: 32 (2035)									
			Jobs						
Population	Households	Automobiles	Retail	Office	Education	Healthcare	Manufacturing	Entertainment	Other
391	162	244	93	27	12	14	56	1	27

5. Project Team Review – Roadway Network

This section summarizes the review process conducted for roadway network data associated with the traffic modeling process utilized for the West Joplin Purpose and Need Statement.

The primary attributes associated with the roadway network are:

- Access control
- Presence of divided roadways
- Presence of center turn lanes
- Number of through lanes
- Free flow speed

Using graphical depictions of these attributes, the project team was able to review and update the attributes and coding of the roadway network.

6. Project Team Review – Access Connections

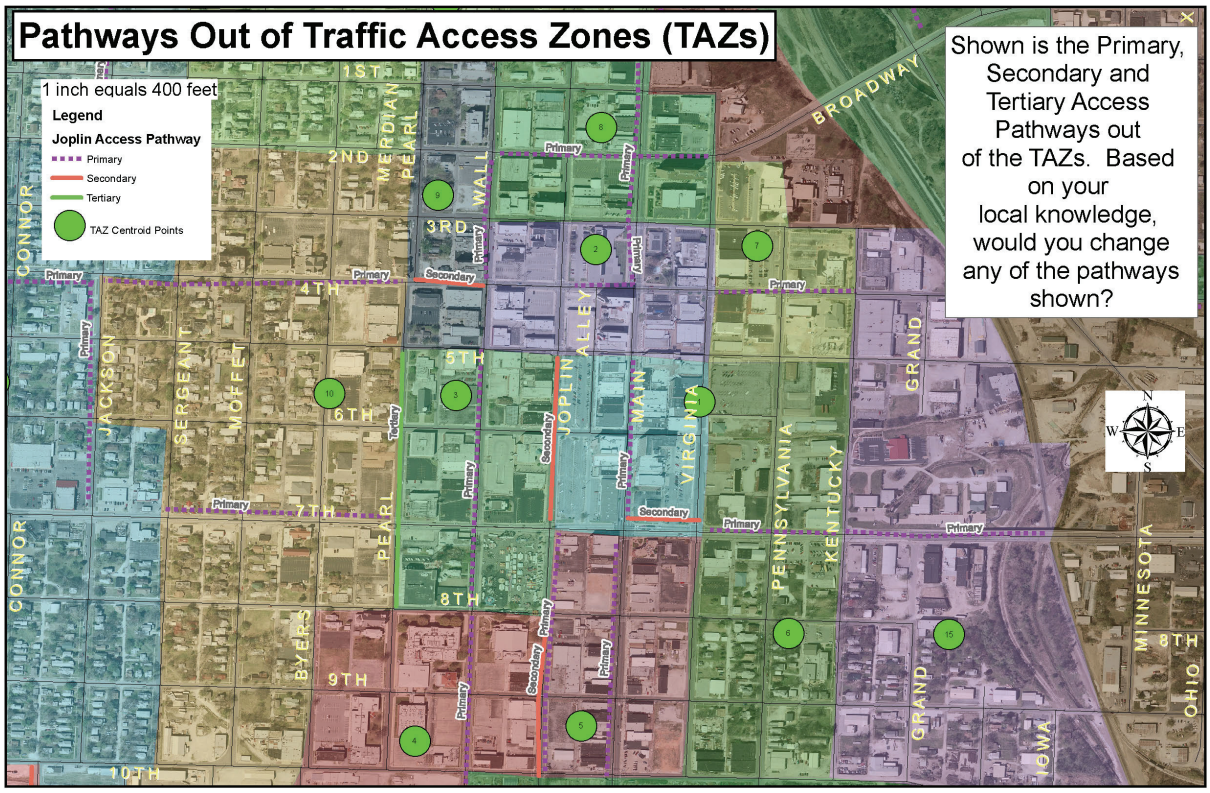
This section summarizes the review process conducted for access connection data associated with the traffic modeling process utilized for the West Joplin Purpose and Need Statement. The primary attributes associated with the access connections are:

Locations of access points from zones to network:
This required verifying where the centroids connect to roads, adding new centroids, or deleting inaccurate ones.

Level of access:
This required that the nature of the access is correct. Specifically, the review was intended to determine whether a centroid is considered primary, secondary or tertiary.

Pathways:
This requires that the location and lengths of pathways be confirmed. The goal is to make sure that the model correctly gets most of the traffic on the correct streets upon its exit.

FIGURE 1
Typical Graphic Used to Update Traffic Model



7. Model Verification Report

The purpose of this section is to assess the reasonableness of model outputs. This travel model will be used to replicate observed conditions in order to represent future travel conditions after development of the western bypass, future development of the casino, and other major projects within the Joplin area.

a. Background

The modeling task for this project began with two models, the Missouri Statewide Travel Demand Model (MOSM) and the Joplin area travel demand model. The MOSM model is more recent and has a dense street network. The Joplin model has a dense zone structure, allowing for better representation of trips and access. The two networks were combined within the greater MOSM statewide network to allow for use of procedures developed for the MOSM model.

Tasks that were completed to develop the existing network are the following:

- Merged MOSM/Joplin street network and zone structure was finalized
- Updated assessment zone access
- Updated major employment to socioeconomic data
- Updated network link attributes (functional class, speeds, lanes, and so forth)

b. Model Verification

For the greater Joplin area, including Webb City and Carl Junction, modeled volumes were compared with the MoDOT 2006 Joplin average annual daily traffic (AADT) counts as provided from the MoDOT website using spreadsheet analysis. Several different methods were used for verification. Two rely on the USDOT Travel Model Validation and Reasonableness Checking Manual (MVRCM), and the other is a statistical method.

Because of the nature of the street network in Joplin, many local streets carry traffic similar to collectors in the area. The model cannot accurately represent all traffic on local streets and collectors carrying fewer than 10,000 vehicles per day. For this reason, the primary concern in verification of the network was on the freeways and arterials.

Single Count Location Target
The USDOT MVRCM defined target values for assessing model systems. The observed versus estimated counts for this project were checked by facility type. The FHWA defines targets for daily volumes by facility type as shown in **Table 3**.

TABLE 3

Functional Classification Target

Facility Type	FHWA Targets (Relative Percentage)
Freeway	+/- 7 percent
Major Arterial	10 percent
Minor Arterial	15 percent
Collector	25 percent

Sources: FHWA, Calibration and Adjustment of System Planning Models, 1990

Table 4 summarizes count and volume relationships in the Joplin street network. The color coding of the cells for “Relative Difference” are locations where the volumes do not meet within the target values from **Table 4.** An orange cell is within 5 percent of the target, and a red cell is greater than 5 percent of the target. The majority of count locations are represented by model volumes within the target values. For locations where volumes differ from the counts, this is typically due to the lack of availability of a street network in the travel demand model.

TABLE 4

Comparison of 2006 Traffic Counts and 2007 O/D Survey to Base Year Model Volumes

Location and Functional Classification	2006 Joplin AADT Maps or 2007 O/D Survey	Model Volume	Relative Difference
Route 171: West of Route D (Principal Art)	16,744	18,342	10 percent
Route 249: South of Route 66 (Collector)	8,979	9,184	2 percent
Route 171: East of Route 43 (Minor Art)	17,230	15,466	-10 percent
Route 43: South of 171 (Minor Art)	18,057	17,505	-3 percent
Route 43: South of 20th (Major Collector)	18,914	18,501	-2 percent
7th Ave: West of Maiden Lane (Major Collector)	17,614	17,298	-2 percent
Business Route 71: North of I44 (Major Collector)	25,072	28,411	13 percent
Business Route 71: At 20th Street (Collector)	35,884	30,219	-16 percent
Business Route 71: North of 7th Street (Collector)	27,817	28,115	1 percent
Business Route 71: South of Demott Drive (Collector)	22,975	21,238	-8 percent
Business Route 71: South of Zora (Collector)	22,770	25,022	10 percent
Route 66: West of Route 249 (Collector)	11,553	11,451	-1 percent
Route 66: East of Route 43 (Collector)	17,255	19,008	10 percent
Powell Dr: North of Route 171 (Collector)	2,534	3,458	36 percent
Route 43: North of Route 171 (Collector)	6,519	7,782	19 percent
Route 171: North of Heron Lane (Collector)	9,006	8,472	-6 percent
Route FF: West of Route 43 (Collector)	19,463	14,612	-25 percent
Route D: South of Hawthorne (Collector)	4,609	5,006	9 percent
Route FF: East of Hall St (Collector)	13,819	12,415	-10 percent
Joplin Street: North of Fir Rd (Collector)	3,105	3,162	2 percent
Demott Drive: West of Route 171 (Collector)	6,968	5,127	-26 percent
Lone Elm Avenue: SW quadrant of 171/43 (Collector)	3,329	4,314	30 percent
Zora Street: At Route 43 intersection (Collector)	6,079	7,315	20 percent
Belle Center Rd: West of Schifferdecker Rd (Freeway)	3,147	2,055	-35 percent
Schifferdecker Rd: South of 7th (Major Collector)	5,819	7,622	31 percent

TABLE 4

Comparison of 2006 Traffic Counts and 2007 O/D Survey to Base Year Model Volumes

Location and Functional Classification	2006 Joplin AADT Maps or 2007 O/D Survey	Model Volume	Relative Difference
Schifferdecker Rd: South of 20th (Minor Art)	8,316	8,029	-3 percent
Route FF: East of Schifferdecker Rd (Minor Art)	6,720	5,466	-19 percent
20th Ave: West of Route 43 (Interstate)	12,685	12,213	-4 percent
Hall St: South of Demott Drive (Interstate)	4,554	3,722	-18 percent
Hall St: North of Zora Drive (Interstate)	5,594	4,085	-27 percent
Oronogo St: South of Demott Drive (Expressway)	2,649	2,839	7 percent
Route TT: East of Route 71 (Collector)	9,168	6,826	-26 percent
20th Street: East of Route 43 (Expressway)	16,300	16,444	1 percent
Murphy Boulevard: West of Route 43 (Collector)	2,020	1,785	-12 percent
Murphy Boulevard: East of Route 43 (Major Collector)	5,018	5,560	11 percent
External Zone: 301=BS 71 (Rangeline) (Major Collector)	6,757	7,172	6 percent
External Zone: 302=Route NN (Minor Art)	2,400	2,532	6 percent
External Zone: 303=Highway 86 (Minor Art)	2,616	2,716	4 percent
External Zone: 304=Highway 43 (South) (Major Collector)	9,437	9,440	0 percent
External Zone: I44 West of Joplin (Freeway)	29,276	28,278	-3 percent
External Zone: 306=Bagdad Road (Collector)	2,449	2,410	-2 percent
External Zone: 307=20th Street (West Side) (Principal Art)	2,990	3,032	1 percent
External Zone: 309=Rt 66 (7th St - West Side) (Collector)	10,380	10,420	0 percent
External Zone: 310=Belle Center Road (Interstate)	1,115	1,118	0 percent
External Zone: 311=Route P (Interstate)	755	802	6 percent
External Zone: 312=Route ZZ west of Route JJ (Interstate)	1,619	1,548	-4 percent
External Zone: 314=Highway 171 (West) (Major Collector)	4,696	5,104	9 percent
External Zone: 315=Highway 43 (North Side) (Collector)	8,480	8,102	-4 percent
External Zone: 316=Route D (Freeway)	4,992	5,014	0 percent
External Zone: 317=Highway 171 (East Side)	11,640	11,756	1 percent

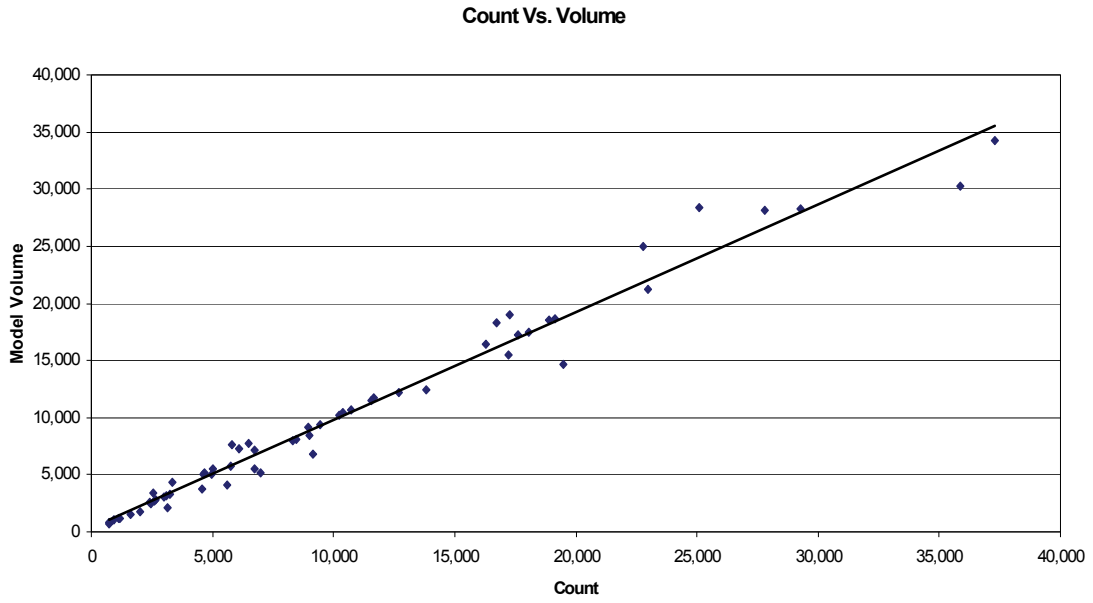
TABLE 4

Comparison of 2006 Traffic Counts and 2007 O/D Survey to Base Year Model Volumes

Location and Functional Classification	2006 Joplin AADT Maps or 2007 O/D Survey	Model Volume	Relative Difference
External Zone: 318=Route HH	5,778	5,740	-1 percent
External Zone: 319=Route AA	956	1,000	5 percent
External Zone: 320=Newman Road	1,190	1,166	-2 percent
External Zone: 321=Rt 66 (7th St - East Side)	10,241	10,260	0 percent
External Zone: 322=20th Street (East Side)	3,240	3,286	1 percent
External Zone: I44 East of Joplin	37,293	34,262	-8 percent
External Zone: 324=Route FF (32nd St)	10,749	10,704	0 percent
External Zone: 325=Warner Road	731	758	4 percent
External Zone: 326=US Highway 71	19,124	18,676	-2 percent

Figure 2 is a scatter graph of counts versus. volumes from **Table 4**. This table shows a consistent trend between counts and volumes.

FIGURE 2
Count versus Volume



Facility Class Targets

Another target was developed by the Contra Costa Transit Authority in the San Francisco Bay Area for freeways and major arterials (link carries over 10,000 vehicles per day). These values are also found in the MVRCM. There are very few major facility links in the system, so the above checks have been modified slightly to make the checks more robust. For the purposes of this project; "freeway" links will be comprised of freeway, interstate, highway, and expressway, and "major arterial" links will be comprised of principal arterials, minor arterials, and major collectors.

- 75 percent of all freeway *(interstate, freeway, and expressway)* links must be within 20 percent of traffic counts
- 50 percent of all freeway *(interstate, freeway, and expressway)* links must be within 10 percent of traffic counts
- 75 percent of all major arterial *(principal arterial, minor arterial and major collector)* links must be within 30 percent of traffic counts
- 50 percent of all major arterial *(principal arterial, minor arterial and major collector)* links must be within 15 percent of traffic counts

The baseline model meets these criteria with 100 percent of freeway locations within 10 percent of the traffic counts, 97 percent of major arterials within 30 percent of traffic counts, and 90 percent of major arterials within 15 percent of traffic counts.

Root Mean Squared Error

The mean squared error (MSE) of a curve and root mean squared error (percent RMSE) value has been calculated for count locations by facility type. The MSE value is the squared distance vertically between the count and the volume. The smaller the MSE, the closer the fit is to the data. The percent RMSE is the squared root of the MSE, and is calculated using the following equation:

$$\%RMSE = \frac{\left(\sum_i (Model_i - Count_i)^2 / (Number\ of\ Counts - 1)\right)^{0.5} * 100}{\left(\sum_i Count_i / Number\ of\ Counts\right)}$$

The RMSE is the average distance of a data point from the fitted line. An appropriate aggregate percent RMSE, as suggested by the Montana DOT is 30 percent. The percent RMSE values for major facilities along the corridor are included in **Table 5.** Typically the percent RMSE value gets larger the smaller the count value, so some of the results are slightly skewed due to low count value. Every location with a percent RMSE greater than 30 percent also has a count location relative difference greater than the target values produced by FHWA.

TABLE 5

Summary of Count Location percent RMSE

Location and Functional Classification	2006 Joplin AADT Maps or 2007 OD Survey	Model Projection	Percent RMSE
Route 171: West of Route D (Freeway)	16,744	18,342	34 percent
Route 249: South of Route 66 (Major Collector)	8,979	9,184	1 percent
Route 171: East of Route 43 (Principal Art)	17,230	15,466	40 percent
Route 43: South of 171 (Principal Art)	18,057	17,505	4 percent
Route 43: South of 20th (Principal Art)	18,914	18,501	2 percent
7th Ave: West of Maiden Lane (Principal Art)	17,614	17,298	1 percent
Business Route 71: North of I44 (Principal Art)	25,072	28,411	99 percent
Business Route 71: At 20th Street (Principal Art)	35,884	30,219	199 percent
Business Route 71: North of 7th Street (Principal Art)	27,817	28,115	1 percent
Business Route 71: South of Demott Drive (Principal Art)	22,975	21,238	29 percent
Business Route 71: South of Zora (Principal Art)	22,770	25,022	50 percent
Route 66: West of Route 249 (Principal Art)	11,553	11,451	0 percent
Route 66: East of Route 43 (Principal Art)	17,255	19,008	40 percent
Route 43: North of Route 171 (Minor Art)	6,519	7,782	54 percent
Route 171: North of Heron Lane (Minor Art)	9,006	8,472	7 percent

TABLE 5

Summary of Count Location percent RMSE

Location and Functional Classification	2006 Joplin AADT Maps or 2007 OD Survey	Model Projection	Percent RMSE
Route FF: West of Route 43 (Major Collector)	19,463	14,612	269 percent
Route D: South of Hawthorne (Major Collector)	4,609	5,006	8 percent
Route FF: East of Hall St (Major Collector)	13,819	12,415	32 percent
External Zone: 301=BS 71 (Rangeline South) (Freeway)	6,757	7,172	6 percent
External Zone: 302=Route NN (Major Collector)	2,400	2,532	2 percent
External Zone: 303=Highway 86 (Minor Art)	2,616	2,716	1 percent
External Zone: 304=Highway 43 (South Side) (Minor Art)	9,437	9,440	0 percent
External Zone: I44 West of Joplin (Interstate)	29,276	28,278	8 percent
External Zone: 306=Bagdad Road (Expressway)	2,449	2,410	0 percent
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External Zone: 315=Highway 43 (North Side) (Minor Art)	8,480	8,102	4 percent
External Zone: 316=Route D (Major Collector)	4,992	5,014	0 percent
External Zone: 317=Highway 171 (East Side) (Freeway)	11,640	11,756	0 percent
External Zone: 318=Route HH (Major Collector)	5,778	5,740	0 percent
External Zone: 319=Route AA (Major Collector)	956	1,000	0 percent
External Zone: 321=Route 66 (7th St - East Side) (Principal Art)	10,241	10,260	0 percent
External Zone: I44 East of Joplin (Interstate)	37,293	34,262	55 percent
External Zone: 324=Route FF (32nd St) (Major Collector)	10,749	10,704	0 percent
External Zone: 326=US Highway 71 (Freeway)	19,124	18,676	2 percent

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c. Conclusion

The transportation model developed for this project combines the procedures and attributes associated with the MOSM model, socioeconomic information, and zone densities associated with the Joplin transportation model. The base year for the modeling is 2007. The majority of counts located within the greater Joplin area are closely represented by the output volumes from the model. The model volumes were compared against two sources of counts, 2006 AADTs from MoDOT, and 2007 counts from the external O/D Survey.

Multiple locations were checked against counts. Several locations do not meet specific FHWA criteria, but can be explained at the collector level due to the relatively low counts, and the representation of local streets in the network. The primary focus was on major facilities, all of which meet or exceed expectations for the targets that were used for comparison. The verification of the base networks is required for development of forecasts for this project.